

ENVIRONMENTAL ASSESSMENT

Reducing Mammal Damage
through an
Integrated Wildlife Damage Management Program
in the
State of Vermont

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WILDLIFE SERVICES

August 2006

TABLE OF CONTENTS

Summary of the Proposed Action	vi
Acronyms	vii
 CHAPTER 1: PURPOSE AND NEED FOR ACTION	
1.0 INTRODUCTION	1
1.1 AUTHORITY AND COMPLIANCE	2
1.1.1 Wildlife Services Legislative Authority	3
1.1.2 Vermont Fish and Wildlife Department (VTFW)	3
1.1.3 Vermont Agency of Agriculture, Food & Markets, Plant Industry Division (VTPID)	3
1.1.4 Vermont Department of Health (VTDH).....	3
1.1.5 U.S. Fish and Wildlife Service (USFWS)	3
1.1.6 Natural Resource Conservation Service.....	4
1.1.7 US Army Corps of Engineers.....	4
1.1.8 Environmental Protection Agency (EPA).....	4
1.1.9 Compliance with Federal and State Statutes	4
1.2 SCOPE AND PURPOSE OF THIS EA	8
1.3 NEED FOR ACTION	9
1.3.1 Need for Mammal Damage Management to Protect Human Health and Safety	9
1.3.2 Need for Mammal Damage Management at Airports	11
1.3.3 Need for Mammal Damage Management to Protect Agriculture.....	12
1.3.4 Need for Mammal Damage Management to Protect Natural Resources	13
1.3.5 Need for Mammal Damage Management to Protect Property	13
1.4 RELATIONSHIP TO OTHER ENVIRONMENTAL DOCUMENTS	13
1.5 WS RECORD KEEPING REGARDING REQUESTS FOR MAMMAL DAMAGE MANAGEMENT ASSISTANCE	13
1.6 PROPOSED ACTION	14
1.7 DECISION TO BE MADE	15
1.8 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT ANALYSIS	15
1.8.1 Actions Analyzed	15
1.8.2 American Indian Lands and Tribes	15
1.8.3 Period for which this EA is Valid	15
1.8.4 Site Specificity	15
1.8.5 Summary of Public Involvement	16
1.9 PREVIEW OF THE REMAINDER OF THIS EA	16
 CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT	
2.0 INTRODUCTION	17
2.1 AFFECTED ENVIRONMENT	17
2.2 ISSUES ANALYZED IN DETAIL IN CHAPTER 4	18
2.2.1 Effects on Target Mammal Species	18

2.2.2 Effects on Other Wildlife Species, including T&E Species	18
2.2.3 Effects on Public Health and Safety	19
2.2.4 Impacts to Stakeholders, including Aesthetics	20
2.2.5 Humaneness and Animal Welfare Concerns of Methods Used	21
2.2.5.1. Humaneness of Using Drowning Sets for Euthanizing Beavers	22
2.2.6 Effects on Wetlands.....	23
2.3 ISSUES NOT CONSIDERED IN DETAIL WITH RATIONALE	24
2.3.1 No Wildlife Damage Management at Taxpayer Expense; Wildlife Damage Management should be Fee Based	24
2.3.2 Mammal Damage Should be Managed by Private Nuisance Wildlife Control Agents	25
2.3.3 Appropriateness of Preparing an EA (Instead of an EIS) for Such a Large Area	25
2.3.4 Wildlife Damage is a Cost of Doing Business — a “Threshold of Loss” Should Be Established Before Allowing Any Lethal MDM.....	25
2.3.5 Effectiveness of Mammal Damage Management Methods	25
CHAPTER 3: ALTERNATIVES	
3.0 INTRODUCTION	27
3.1 DESCRIPTION OF THE ALTERNATIVES	27
3.1.1 Alternative 1: Technical Assistance Only	27
3.1.2 Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)	27
3.1.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS	28
3.1.4 Alternative 4: No Federal WS Mammal Damage Management	28
3.2 MDM STRATEGIES AND METHODOLOGIES AVAILABLE TO WS IN VERMONT.....	28
3.2.1 Integrated Wildlife Damage Management (IWDM)	28
3.2.2 The IWDM Strategies Employed by WS	29
3.2.2.1 Examples of WS Direct Operational and Technical Assistance in BDM in Vermont	30
3.2.3 WS Decision Making	30
3.2.4 Mammal Damage Management Methods Available for Use	31
3.2.4.1 Non-chemical Methods	31
3.2.4.2 Chemical Methods	32
3.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE	33
3.3.1 Lethal Mammal Damage Management Only by WS	33
3.3.2 Compensation for Mammal Damage Losses	33
3.3.3 Short Term and Long Term Population Suppression	34
3.3.4 Nonlethal Methods Implemented Before Lethal Methods.....	34
3.3.5 Bounties.....	34
3.4 STANDARD OPERATING PROCEDURES FOR MAMMAL DAMAGE MANAGEMENT TECHNIQUES	35
3.4.1 Standard Operating Procedures	35
3.4.2 Additional SOPs Specific to the Issues	35
CHAPTER 4: ENVIRONMENTAL CONSEQUENCES	
4.0 INTRODUCTION	38
4.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL	38

4.1.1 Effects on Target Mammal Species Populations	38
4.1.1.1 Alternative 1: Technical Assistance Only	39
4.1.1.2 Alternative 2: Integrated Mammal Damage Management Program (Proposed Action /No Action)	39
4.1.1.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS	47
4.1.1.4 Alternative 4: No Federal WS Mammal Damage Management	48
4.1.2 Effects on Other Wildlife Species, including T&E Species	48
4.1.2.1 Alternative 1: Technical Assistance Only	48
4.1.2.2 Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)	49
4.1.2.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS	50
4.1.2.4 Alternative 4: No Federal WS Mammal Damage Management	51
4.1.3 Effects on Human Health and Safety	51
4.1.3.1 Safety and Efficacy of Chemical Control Methods.....	51
4.1.3.2 Impacts on Human Safety of Non-chemical BDM Methods....	53
4.1.4 Impacts to Stakeholders, including Aesthetics	55
4.1.4.1 Effects on Human Affectionate Bonds with Individual Mammals and on Aesthetic Values of Wild Mammal Species	56
4.1.4.2 Effects on Aesthetic Values of Property Damaged by Mammals	57
4.1.5 Humaneness and Animal Welfare Concerns of Methods Used	58
4.1.5.1 Alternative 1: Technical Assistance Only	58
4.1.5.2 Alternative 2: Implement an Integrated Mammal Damage Management Program (Proposed Action/No Action)	58
4.1.5.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS	59
4.1.5.4 Alternative 4: No Federal WS Mammal Damage Management	59
4.1.6 Effects on Wetlands	59
4.1.6.1 Alternative 1: Technical Assistance Only.....	59
4.1.6.2 Alternative 2: Implement an Integrated Mammal Damage Management Program (Proposed Action/No Action)..	59
4.1.6.3 Alternative 3: Non-lethal mammal Damage Management Only by WS.....	60
4.1.6.4 Alternative 4: No Federal WS Mammal Damage Management	60
4.2 CUMULATIVE IMPACTS	60

CHAPTER 5: LIST OF PREPARERS AND PERSONS CONSULTED

5.1 LIST OF PREPARERS/REVIEWERS	65
5.2 LIST OF PERSONS CONSULTED	65

Tables

Table 1-1. Annual number of requests for technical assistance involving mammals to Vermont Wildlife Services during 1997-2005.	14
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Table 4-1.	Mammals lethally removed by WS for Mammal Damage Management during FY 2000 through FY 2005 in Vermont.....	39
Table 4-2.	Summary of Potential Impacts	64
Figure		
Figure 3-1.	WS Decision Model	31
Appendices		
Appendix A.	Literature Cited	66
Appendix B.	Mammal Damage Management Available for use or Recommendation by the Vermont Wildlife Services Program.....	75
Appendix C.	Federally Listed Threatened and Endangered Species in Vermont.....	80
Appendix D.	Correspondence from USFWS Regarding Federal T&E Species	81
Appendix E.	State Listed Threatened and Endangered Species in Vermont	84
Appendix F.	Correspondence from VTFW Regarding State-listed T&E Species	86
Appendix G.	Criteria for Beaver Dam Breaching/Removal	89

SUMMARY OF PROPOSED ACTION

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) proposes to continue the current damage management program that responds to mammal damage in the State of Vermont. An Integrated Wildlife Damage Management (IWDM) approach would be implemented to reduce mammal damage to property, agricultural resources (including livestock), natural resources, and human/public health and safety. Damage management would be conducted on public and private property in Vermont when the resource owner (property owner) or manager requests assistance. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification or harassment would be recommended and utilized to reduce damage. In other situations, mammals would be removed as humanely as possible using: shooting, trapping, snaring, and FDA or EPA approved chemical products. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or could include instances where application of lethal methods alone would be the most appropriate strategy.

Mammal damage management activities would be conducted in the State, when requested and funded, on private or public property, including airport facilities and adjacent or nearby properties, after an *Agreement for Control* or other comparable document has been completed. All management activities would comply with appropriate Federal, State, and Local laws, including applicable laws and regulations authorizing the take of mammals in Vermont.

ACRONYMS

ADC	Animal Damage Control
APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FDA	Food and Drug Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FY	Fiscal Year
IWDM	Integrated Wildlife Damage Management
MBTA	Migratory Bird Treaty Act
MIS	Management Information System
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
UVM	University of Vermont
VTAAFM	Vermont Agency of Agriculture, Food & Markets
VTAOT	Vermont Agency of Transportation
VTFW	Vermont Fish and Wildlife Department
VTDH	Vermont Department of Health
VTPID	VTAAFM, Plant Industry Division
SOP	Standard Operating Procedure
T&E	Threatened and Endangered
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFWS	U.S. Fish and Wildlife Service
WS	Wildlife Services

NOTE: On August 1, 1997, the Animal Damage Control program was officially renamed to Wildlife Services. The phrases Animal Damage Control, ADC, Wildlife Services, and WS are used synonymously throughout this Environmental Assessment.

CHAPTER 1: PURPOSE AND NEED FOR ACTION

1.0 INTRODUCTION

Across the United States, wildlife habitat has been substantially changed as human populations expand and land is used for human needs. These human uses and needs often compete with wildlife which increases the potential for conflicting human/wildlife interactions. In addition, segments of the public desire protection for all wildlife; this protection can create localized conflicts between human and wildlife activities. The *Animal Damage Control Programmatic Final Environmental Impact Statement* (EIS) summarizes the relationship in American culture of wildlife values and wildlife damage in this way United States Department of Agriculture (USDA) 1997):

"Wildlife has either positive or negative values, depending on varying human perspectives and circumstances . . . Wildlife is generally regarded as providing economic, recreational and aesthetic benefits . . . and the mere knowledge that wildlife exists is a positive benefit to many people. However . . . the activities of some wildlife may result in economic losses to agriculture and damage to property . . . Sensitivity to varying perspectives and value is required to manage the balance between human and wildlife needs. In addressing conflicts, wildlife managers must consider not only the needs of those directly affected by wildlife damage but a range of environmental, sociocultural and economic considerations as well."

Wildlife damage management is the science of reducing damage or other problems associated with wildlife and is recognized as an integral part of wildlife management (The Wildlife Society 1990). The USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program (formerly known as Animal Damage Control) uses an Integrated Wildlife Damage Management (IWDM) approach, known as Integrated Pest Management (WS Directive 2.105¹), in which a combination of methods may be used or recommended to reduce wildlife damage. IWDM is described in Chapter 1:1-7 of USDA (1997). These methods may include alteration of cultural practices and habitat and behavioral modification to prevent or reduce damage. The reduction of wildlife damage may also require that local populations be reduced through lethal means.

This environmental assessment (EA) documents the analysis of the potential environmental effects of a proposed mammal damage management (MDM) program. This analysis relies on data contained in published documents (Appendix A), including the *Animal Damage Control Program Final Environmental Impact Statement* (USDA 1997). The final environmental impact statement (USDA 1997) may be obtained by contacting the USDA, APHIS, WS Operational Support Staff at 4700 River Road, Unit 87, Riverdale, MD 20737-1234.

WS is the federal agency directed by law and authorized to protect American resources from damage associated with wildlife (Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c). To fulfill this Congressional direction, WS activities are conducted to prevent or reduce wildlife damage caused to agricultural, industrial and natural resources; property; livestock; and threats to public health and safety on private and public lands in cooperation with federal, state and local agencies, private organizations, and individuals. Therefore, wildlife damage management is not based on punishing offending animals but as one means of reducing damage and is used as part of the WS Decision Model (Slate et al. 1992). The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated. The need for action is derived from the specific threats to resources or the public.

Normally, according to the APHIS procedures implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions may be categorically excluded {7 CFR 372.5(c),

¹ WS Policy Manual - Provides guidance for WS personnel to conduct wildlife damage management activities through Program Directives. WS Directives referenced in this EA can be found in the manual but will not be referenced in the Literature Cited Appendix.

60 Fed. Reg. 6,000 -6,003, (1995)}. WS has decided in this case to prepare this EA to facilitate planning, interagency coordination, and the streamlining of program management, and to clearly communicate with the public the analysis of individual and cumulative impacts. In addition, this EA has been prepared to evaluate and determine if there are any potentially significant or cumulative impacts from the proposed and planned damage management program. All wildlife damage management that would take place in Vermont would be undertaken according to relevant laws, regulations, policies, orders and procedures, including the Endangered Species Act (ESA). Notice of the availability of this document will be made consistent with the agency's NEPA procedures.

WS is a cooperatively funded, service-oriented program that receives requests for assistance from private and public entities, including other governmental agencies. Before any wildlife damage management is conducted, Cooperative Agreements, Agreements for Control or other comparable documents are in place. As requested, WS cooperates with land and wildlife management agencies to reduce wildlife damage effectively and efficiently according to applicable federal, state and local laws and Memorandums of Understanding (MOUs) between WS and other agencies. WS's mission, developed through its strategic planning process, is

1) *"to provide leadership in wildlife damage management in the protection of America's agricultural, industrial and natural resources, and*

2) *to safeguard public health and safety."*

WS's Policy Manual reflects this mission and provides guidance for engaging in wildlife damage management through:

- Training of wildlife damage management professionals;
- Development and improvement of strategies to reduce losses and threats to humans from wildlife;
- Collection, evaluation, and dissemination of management information;
- Informing and educating the public on how to reduce wildlife damage;
- Providing data and a source for limited-use management materials and equipment, including pesticides (USDA 1989)

1.1 AUTHORITY AND COMPLIANCE

1.1.1 Wildlife Services Legislative Authority

The USDA is directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for the Wildlife Services program is the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c), which provides that:

"The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the wildlife services authorities in effect on the day before the date of the enactment of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2001."

Since 1931, with changes in societal values, WS policies and its programs place greater emphasis on the part of the Act discussing "bringing (damage) under control", rather than "eradication" and "suppression" of wildlife populations. In 1988, Congress strengthened the legislative directive and authority of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act. This Act states, in part:

"That hereafter, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and

public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammals and birds species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities."

1.1.2 Vermont Fish and Wildlife Department

The mission of the Vermont Fish and Wildlife Department (VTFW) is to protect and conserve our fish, wildlife, plants and their habitats for the people of Vermont. VTFW handles wildlife damage management problems involving black bear, deer, rabbit and fur-bearer species. WS and the VTFW cooperatively assist VT airports with wildlife hazard management issues related to mammals, such as white-tailed deer. The VTFW Non-game and Natural Heritage Program (NNP) administers and conducts management and education programs for endangered, threatened, and non-game wildlife species in VT.

1.1.3 Vermont Agency of Agriculture, Food & Markets, Plant Industry Division

The Vermont Agency of Agriculture, Food & Markets (VTAAFM) Plant Industry Division (VTPID) enforces state laws pertaining to the use and application of pesticides, including those related to the registration of pesticide products, licensing of private and commercial pesticide applicators, and licensing of pesticide businesses. The PID implements regulations found in V.S.A. Title 6 Chapter 87, Sections 1101-1112. Pesticide products for mammal damage control are registered through the PID by USDA APHIS WS and other entities (eg. pesticide manufacturers).

1.1.4 Vermont Department of Health

The Vermont Department of Health (VTDH), VTFW and VTAAFM currently have a cooperative agreement with WS, which establishes a cooperative relationship between WS and the VTDH, and outlines roles and responsibilities for resolving wildlife damage management situations when it concerns a rabies threat in Vermont and the oral rabies vaccination (ORV) program. The VTDH provides technical guidance to WS on public health related issues and potential health problems associated with wildlife, and refers callers with wildlife damage related questions to WS.

1.1.5 U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) is responsible for managing and regulating take of bird species that are listed as migratory under the Migratory Bird Treaty Act (MBTA) and those that are listed as threatened or endangered under the ESA. In Vermont, the USFWS administers two National Wildlife Refuges (Missisquoi NWR and Silvio O. Conte NR&W), one Law Enforcement Office (in Essex Jct., VT), and two National Fish Hatcheries (Pittsford and Bethel, VT).

The USFWS authority for action is based on the MBTA of 1918 (as amended), which implements treaties with the United States, Great Britain (for Canada), the United Mexican States, Japan, and the Soviet Union. Section 3 of this Act authorized the Secretary of Agriculture:

"From time to time, having due regard to the zones of temperature and distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds, to determine when, to what extent, if at all, and by what means, it is compatible with the terms of the convention to allow hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any such bird, or any part, nest, or egg thereof, and to adopt suitable regulations permitting and governing the same, in accordance with such determinations, which regulations shall become effective when approved by the President."

The authority of the Secretary of Agriculture, with respect to the Migratory Bird Treaty, was transferred to the Secretary of the Interior in 1939 pursuant to Reorganization Plan No. II. Section 4(f), 4 Fed. Reg. 2731, 53 Stat. 1433.

CFR 50 Subchapter C - The National Wildlife Refuge System - Part 30 - Feral Animals - Subpart B-30.11 - Control of feral animals states: (a) Feral animals, including horses, burros, cattle, swine, sheep, goats, reindeer, dogs, and cats, without ownership that have reverted to the wild from a domestic state may be taken by authorized federal or state personnel or by private persons operating under permit in accordance with applicable provisions of federal or state law or regulation.

1.1.6 Natural Resource Conservation Service

Natural Resource Conservation Service (NRCS) is responsible for certifying wetlands under the Wetland Conservation provisions of the Food Security Act (16 U.S.C. 3821 and 3822). Topographic maps are available through their offices that identify the presence of wetlands.

1.1.7 U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (COE) regulates and permits activities regarding waters of the United States including protection and utilization under Section 404 of the Clean Water Act.

1.1.8 U.S. Environmental Protection Agency

U.S. Environmental Protection Act (EPA) is responsible for implementing and enforcing the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) which regulates the registration and use of pesticides. The EPA is also responsible for administering and enforcing the Section 404 program of the Clean Water Act with the COE; this established a permit program for the review and approval of water quality standards that directly impact wetlands.

1.1.9 Compliance with Federal and State Statutes

Several federal laws, state laws, and state regulations regulate WS wildlife damage management. WS complies with these laws and regulations, and consults and cooperates with other agencies as appropriate.

National Environmental Policy Act. Environmental documents pursuant to NEPA must be completed before operational activities consistent with the NEPA decision can be implemented. This EA meets the NEPA requirement for the proposed action in Vermont. When WS direct management assistance is requested by another federal agency, NEPA compliance is the responsibility of the other federal agency. However, WS could agree to complete NEPA documentation at the request of the other federal agency. WS also coordinates specific projects and programs with other agencies. The purpose of these contacts is to coordinate any wildlife damage management that may affect resources managed by these agencies or affect other areas of mutual concern.

Endangered Species Act (ESA). It is federal policy, under the ESA, that all federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act (Sec. 2(c)). WS conducts Section 7 consultations with the USFWS to use the expertise of the USFWS to ensure that "any action authorized, funded or carried out by such an agency... is not likely to jeopardize the continued existence of any endangered or threatened species . . . each agency shall use the best scientific and commercial data available" (Sec. 7(a)(2)). WS obtained a Biological Opinion (B.O.) from the USFWS describing potential effects on T&E species and prescribing reasonable and prudent measures for avoiding jeopardy (USDA 1997, Appendix F). Additionally, WS conferred with the USFWS in preparation of this EA during 2006, regarding an analysis of potential impacts to Federally listed and candidate species (Appendix D) in VT.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. The EPA is responsible for

implementing and enforcing FIFRA. All chemical methods integrated into the WS program in Vermont are registered with and regulated by the EPA and VTAAFM Plant Industry Division and used by WS in compliance with labeling procedures and other requirements.

The Clean Water Act (33 U.S.C. 1344). The Clean Water Act provides regulatory authority and guidelines for the EPA and the COE related to wetlands. Several Sections of the Clean Water Act pertain to regulating effects on wetlands. Section 101 specifies the objectives of this Act, which are implemented largely through Subchapter III (Standards and Enforcement), Section 301 (Prohibitions). The discharge of dredged or fill material into waters of the United States is subject to permitting specified under Subchapter IV (Permits and Licenses) of this Act. Section 401 (Certification) specifies additional requirements for permit review particularly at the State level. WS consults with appropriate regulatory authorities when wetlands exist in proximity to proposed activities or when such activities might impact wetland areas. Such consultations are designed to determine if any wetlands will be affected by proposed actions.

Food Security Act. The Wetland Conservation provision (Swampbuster) of the 1985 (16 U.S.C. 3801-3862), 1990 (as amended by PL 101-624), and 1996 (as amended by PL 104-127) Food Security Act require all agricultural producers to protect wetlands on the farms they own. Wetlands converted to farmland prior to December 23, 1985 are not subject to wetland compliance provisions even if wetland conditions return as a result of lack of maintenance or management. If prior converted cropland is not planted to an agricultural commodity (crops, native and improved pastures, rangeland, tree farms, and livestock production) for more than 5 consecutive years and wetland characteristics return, the cropland is considered abandoned and then becomes a wetland subject to regulations under Swampbuster and Section 404 of the Clean Water Act. NRCS is responsible for certifying wetland determinations according to this Act.

Federal Food, Drug, and Cosmetic Act (21 U.S.C. 360). This law places administration of pharmaceutical drugs, including those used in wildlife capture and handling, under the Food and Drug Administration (FDA).

Controlled Substances Act of 1970 (21 U.S.C. 821 et seq.). This law requires an individual or agency to have a special registration number from the federal Drug Enforcement Administration (DEA) to possess controlled substances, including those that are used in wildlife capture and handling.

Animal Medicinal Drug Use Clarification Act of 1994 (AMDUCA). The AMDUCA and its implementing regulations (21 CFR Part 530) establish several requirements for the use of animal drugs, including those used to capture and handle wildlife. Those requirements are: (1) a valid "veterinarian-client-patient" relationship, (2) well defined record keeping, (3) a withdrawal period for animals that have been administered drugs, and (4) identification of animals. A veterinarian, either on staff or on an advisory basis, would be involved in the oversight of the use of animal capture and handling drugs under the proposed action. Veterinary authorities in each state have the discretion under this law to establish withdrawal times (i.e., a period of time after a drug is administered that must lapse before an animal may be used for food) for specific drugs. Animals that might be consumed by a human within the withdrawal period must be identified; the Western Wildlife Health Committee of the Western Association of Fish and Wildlife Agencies has recommended that suitable identification markers include durable ear tags, neck collars, or other external markers that provide unique identification (WWHC *undated*). APHIS-WS establishes procedures in each state for administering drugs used in wildlife capture and handling that must be approved by state veterinary authorities in order to comply with this law.

Occupational Safety and Health Act of 1970. The Occupational Safety and Health Act of 1970 and its implementing regulations (29CFR1910) on sanitation standards states that, "Every enclosed workplace shall be so constructed, equipped, and maintained, so far as reasonably practical, as to prevent the entrance or harborage of rodents, insects, and other vermin. A continuing and effective extermination program shall be instituted where their presence is detected." This standard includes mammals that may cause safety and health concerns at workplaces.

The Native American Graves and Repatriation Act of 1990. The Native American Graves Protection and Repatriation Act requires federal agencies to notify the Secretary of the Department that manages the federal lands upon the discovery of Native American cultural items on federal or tribal lands. Federal projects would discontinue work until a reasonable effort has been made to protect the items and the proper authority has been notified.

National Historic Preservation Act (NHPA) of 1966 as amended. The NHPA of 1966, and its implementing regulations (36 CFR 800), requires federal agencies to: 1) determine whether activities they propose constitute "undertakings" that has the potential to cause effects on historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the Advisory Council on Historic Preservation (i.e. State Historic Preservation Office, Tribal Historic Preservation Officers), as appropriate. WS actions on tribal lands are only conducted at the tribe's request and under signed agreement; thus, the tribes have control over any potential conflict with cultural resources on tribal properties.

Each of the MDM methods described in Appendix B that might be used operationally by WS do not cause major ground disturbance, do not cause any physical destruction or damage to property, do not cause any alterations of property, wildlife habitat, or landscapes, and do not involve the sale, lease, or transfer of ownership of any property. In general, such methods also do not have the potential to introduce visual, atmospheric, or audible elements to areas in which they are used that could result in effects on the character or use of historic properties. Therefore, the methods that would be used by WS under the proposed action are not generally the types of activities that would have the potential to affect historic properties. If an individual activity with the potential to affect historic resources is planned under an alternative selected as a result of a decision on this EA, then site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary.

There is potential for audible effects on the use and enjoyment of a historic property when methods such as propane exploders, pyrotechnics, firearms, or other noise-making methods are used at or in close proximity to such sites for purposes of hazing or removing wildlife. However, such methods would only be used at a historic site at the request of the owner or manager of the site to resolve a damage or nuisance problem, which means such use would be to benefit the historic property. A built-in mitigating factor for this issue is that virtually all of the methods involved would only have temporary effects on the audible nature of a site and can be ended at any time to restore the audible qualities of such sites to their original condition with no further adverse effects. Site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary in those types of situations.

Environmental Justice and Executive Order 12898 - "Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations." Executive Order 12898, promotes the fair treatment of people of all races, income levels and cultures with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Environmental justice is the pursuit of equal justice and protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. Environmental Justice is a priority within APHIS and WS. Executive Order 12898 requires federal agencies to make environmental justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of federal programs, policies and activities on minority and low-income persons or populations. APHIS implements Executive Order 12898 principally through its compliance with NEPA. All WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898.

WS personnel use only legal, effective, and environmentally safe wildlife damage management methods, tools, and approaches. All chemicals used by WS are regulated by the EPA through FIFRA, VTAAFM Plant Industry Division (VTPID), FDA, by MOUs with land managing agencies, and by WS Directives. Based on a thorough Risk Assessment, APHIS concluded that when WS program chemicals are used according to label directions, they are selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997, Appendix P). The WS operational program properly

disposes of any excess solid or hazardous waste. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations. In contrast, the proposed action may benefit minority or low-income populations by reducing mammal damage such as threats to public health and safety.

Protection of Children from Environmental Health and Safety Risks (Executive Order 13045).

Children may suffer disproportionately from environmental health and safety risks for many reasons, including their development physical and mental status. Because WS makes it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children, WS has considered the impacts that this proposal might have on children. The proposed mammal damage management program would only occur by using legally available and approved methods where it is highly unlikely that children would be adversely affected. For these reasons, WS concludes that it would not create an environmental health or safety risk to children from implementing this proposed action.

Vermont Wildlife Laws, Regulations and Policies Regarding Mammal Damage Management

Vermont Statutes Annotated (V.S.A.) Title 10 contains fish, game, and wildlife law for the State of Vermont.

1. VSA 10 sec. 4138 Control of fish, game; powers of commissioner: (c) "Any measures which involve temporary pollution of waters shall be carried out in accordance with the provisions of section 1263a of chapter 47 of this title." (d) "The commissioner shall cooperate with the transportation board in any proceeding brought under section 37 of Title 19 to protect a highway, railroad or public airport from impoundments of water by beaver."
2. VSA 10:113 sec. 4138, Regulation 44 (h) "Translocation of nuisance/problem raccoons, foxes, skunks and woodchucks will be prohibited and such animals must be released at the point of capture or humanely destroyed."
3. VSA 10:113 sec. 4709 "It is unlawful to import and possess live raccoons, foxes, skunks and woodchucks in Vermont and no permits to do so will be granted."
4. VSA 10:113 sec. 4826 Taking deer damaging crops (a)" A person, including an authorized member of his family or his authorized regular on-premise employee, may take, on land owned or occupied by him, a deer which he can prove was doing damage to the following: (1) a tree which is being grown in a plantation or being cultivated and from which he intends to harvest an annual or perennial crop or from which he intends to produce any marketable item; or (2) a crop bearing plant; or (3) a crop, except grass."
5. VSA 10:13 sec. 4827 Black bear doing damage. (a) A person, an authorized member of the person's family, or the person's authorized regular on-premise employee may take, on land owned or occupied by the person, a bear which he or she can prove was doing damage to the following: (1) livestock, a pet, or another domestic animal; (2) bees or bee hives; (3) a vehicle, building, shed, or any dwelling; or (4) a crop or crop-bearing plant other than grass."
6. VSA 10:13 sec. 4828 Taking of rabbit or fur-bearing animals by landowner; selectmen; certificate; penalty. (a) The provisions of law or regulations of the board relating to the taking of rabbits or fur-bearing animals shall not apply to an owner, the owner's employee, tenant, or caretaker of property protecting the property from damage by rabbits or fur-bearing animals, or to the selectboard of a town protecting public highways or bridges from such damage or submersion with the permission of the owner of lands affected. However, if required by rule of the board, an owner, employee, tenant or caretaker, or the members of the selectboard, who desire to possess during the closed season the skins of any fur-bearing animals taken in defense of property, highways, or bridges shall notify the commissioner or the commissioner's representative within eighty-four hours after taking such animal, and shall hold such pelts for inspection by such authorized representatives. (b) Before disposing of such pelts, if required by rule of the board, the property owner, employee, tenant, caretaker or selectboard shall secure from the commissioner or a designee a certificate describing the pelts, and showing that the pelts were legally taken during a closed season and in defense of property, highways or bridges. In the event of storage, sale or transfer, such certificates shall accompany the pelts described therein.

7. VSA 10:113 sec. 4829 Person suffering damage by deer or black bear. A person who suffers damage by deer to the person's crops, fruit trees, or crop-bearing plants on land not posted against the hunting of deer, or a person who suffers damage by black bear to the person's cattle, sheep, swine, poultry or bees or bee hives on land not posted against hunting or trapping of black bear is entitled to reimbursement for the damage, and may apply to the department of fish and wildlife within seventy-two hours of the occurrence of the damage and may apply to the department of fish and wildlife within seventy-two hours of the occurrence of the damage for reimbursement for the damage.
8. VSA 10:113 sec. 4833 Coyote control program. The commissioner shall develop a coyote control program for implementation in those areas of the state where he or she has determined that predation by coyotes is posing a threat to domesticated animals, deer and other wildlife. In no event shall the program use poison.
9. VSA 10:113 sec. 5215 Rehabilitation of raccoons, foxes, skunks and woodchucks is prohibited until further notice, except by special rehabilitation permit.
10. VS A 10: App. 43 Method of taking: (e) "A person shall not interfere in any manner with dams, dens or houses of beaver except upon special permit in writing from the commissioner, provided, however, that these provisions shall not apply to an owner of property, the agent, employee, tenant, or caretaker of the owner protecting the same from damage from beaver, or to the legislative body of a municipality or the agency of transportation, within their respective jurisdictions, when protecting public highways or bridges from such damage or submission, with permission of the owners of lands affected, or to a person acting under authority of an order under section 37 of Title 19.

Vermont Pesticide Laws

Vermont's pesticide regulations, V.S.A. Title 6 Chapter 87, Section I-XIII, are implemented and enforced by the VTAAFM Plant Industry Division (PID). These regulations include processes and requirements licenses, certificates and permits issued by the VAAFM (Section II), restrictions on the use and application of pesticides (Section IV), Maintenance of records by certified applicators, licensed companies, licensed pesticide dealers and pesticide producing establishments (Section V), company license (Section VI), requirements for certified commercial and certified noncommercial applicators (Section VII), certification standards for commercial applicators and noncommercial applicators using other than Class "C" pesticides (Section VIII), certification of private applicators (Section IX), classification of pesticides and limitations on sale (Section X), pesticide dealer licenses (Section XI), community right-to-know requirements and accident reporting (Section XII) and transportation, storage and disposal of pesticides (Section XIII).

In order for WS to apply a restricted use pesticide as part of mammal damage management in VT, the product must be registered with the VAAFM PID, the applicator must be certified, the applicator possess a VT pesticide applicator certificate. Additionally, label instructions, and all other pesticide and wildlife laws and regulations must be adhered to. Pesticide products are registered annually, and applicator certificates are obtained and maintained through completion of training courses and examinations conducted through the PID.

1.2 SCOPE AND PURPOSE OF THIS EA

The scope and purpose of this EA is to address and evaluate the potential impact to the human environment from the implementation of a WS MDM program to protect agricultural resources; natural resources property; and human/public health and safety in Vermont. Damage problems can occur throughout the State, resulting in requests for WS assistance. Under the Proposed Action, MDM could be conducted on private, federal, state, tribal, county, and municipal lands in Vermont upon request.

Several mammal species have potential to be the subject of WS MDM control activities in Vermont. Mammals species addressed in this EA include beaver (*Castor canadensis*), red fox (*Vulpes vulpes*), raccoons (*Procyon lotor*), striped skunks (*Mephitis mephitis*), woodchucks (*Marmota monax*), white-tailed deer (*Odocoileus virginianus*), moose (*Alces alces*), black bear (*Ursus americanus*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), river otter (*Lutra canadensis*), mink (*Mustela vison*), muskrats (*Ondatra zibethicus*), and porcupine (*Erethizon dorsatum*).

1.3 NEED FOR ACTION

Conflicts between humans and wildlife are common in Vermont. The need for action in Vermont is based on the necessity for a program to protect agriculture resources, property, natural resources, and human/public health and safety from mammal damage. Mammals can have a negative economic impact in Vermont. Comprehensive surveys of mammal damage in Vermont have not been conducted. Table 1-1 provides a summary of Technical Assistance projects completed by the Vermont WS program for Fiscal Years 1997-2005. These data represent only a portion of the total damage caused by mammals because not all people who experience damage request assistance from WS.

1.3.1 Need for Mammal Damage Management to Protect Human Health and Safety

A considerable threat to human health is sometimes presented by disease organisms or parasites carried by some mammals which are transmissible or infectious to humans (Davidson and Nettles 1997). These include viral, bacterial, mycotic (fungal), protozoal and rickettsial diseases. Several of these diseases are transmittable to humans. Individuals or property owners that request assistance with mammals frequently are concerned about potential disease risks but are unaware of the types of diseases that can be associated with them. In most such situations, MDM is requested because of a perceived risk to human health or safety associated with wild animals living in close association with humans, or from animals acting out of character by roving in human-inhabited areas during daylight, or showing no fear when humans are present. Under the proposed action, WS could agree to assist in resolving these types of problems. In the majority of cases in which human health concerns are a reason for requesting MDM, there may have been no actual cases of transmission of disease to humans by mammals to prompt the request. Thus, it is the risk of disease transmission that is the primary reason for requesting and conducting MDM. Situations in Vermont where the threat of disease associated with mammal populations may include:

- Exposure by residents to the threat of raccoon rabies due to high populations of raccoons in urban settings or from companion animals coming in contact with infected raccoons in any environment.
- Accumulated droppings from denning or foraging raccoons and subsequent exposure to raccoon roundworm in fecal deposits in a suburban community or at an industrial site where humans must work or live in areas of accumulation.
- Exposure of humans to threats of rabies posed by skunks denning and foraging in a residential community.
- Threats of parasitic infections to humans from *Giardia* spp. resulting from high beaver populations in a park or recreation area where swimming is allowed.

Rabies

In Vermont, raccoons are abundant in urban environments and have been associated with the spread of rabies in the Eastern U.S., including Vermont (USDA 2001). Rabies is an acute, fatal viral disease of mammals most often transmitted through the bite of a rabid animal and poses a threat to domestic animals and humans. The disease can be effectively prevented in humans and many domestic animals species, but abundant and widely distributed reservoirs among wild mammals complicate rabies control. The vast majority of rabies cases reported to the Centers for Disease Control and Prevention (CDC) each year occur in raccoons, skunks (primarily *Mephitis mephitis*), and bats (Order *Chiroptera*) (USDA 2001).

Over the last 100 years, rabies in the United States has changed dramatically. About 90% or greater of all animal cases reported annually to CDC now occur in wildlife (Krebs et al. 2000; CDC 2001a.). Before 1960 the majority of cases were reported in domestic animals. The principal rabies hosts today are wild carnivores and bats. The number of rabies-related human deaths in the U.S. has declined from more than 100 annually at the turn of the century to an average of one or two people per year in the 1990's. Modern day prophylaxis, which is the series of vaccine injections given to people who have

been potentially or actually exposed, has proven nearly 100% successful in preventing mortality when administered promptly (CDC 2001a). In the U.S., human fatalities associated with rabies occur in people who fail to seek timely medical assistance, usually because they were unaware of their exposure to rabies. Although human rabies deaths are rare, the estimated public health costs associated with disease detection, prevention, and control have risen, exceeding \$300 million annually. These costs include the vaccination of companion animals, maintenance of rabies laboratories, medical costs such as those incurred for exposure case investigations, rabies post-exposure prophylaxis (PEP) and animal control programs (CDC 2001a).

Accurate estimates of the aforementioned expenditures are not available. Although the number of PEPs given in the U.S. each year is unknown, it is estimated to be about 40,000. When rabies becomes epizootic or enzootic (i.e., present in an area over time but with a low case frequency) in a region, the number of PEPs in that area increases. Although the cost varies, a course of rabies immune globulin and five doses of vaccine given over a 4-week period typically exceeds \$1,000 (CDC 2001a) and has been reported to be as high as \$3,000 or more (Meltzer 1996). As epizootics spread in wildlife populations, the risk of “mass” human exposures requiring treatment of large numbers of people that contact individual rabid domestic animals infected by wild rabid animals increase. One case in Massachusetts involving contact with, or drinking milk from, a single rabid cow required PEPs for a total of 71 persons (CDC 2001b). The total cost of this single incident exceeded \$160,000 based on a median cost of \$2,376 per PEP in Massachusetts. Likely the most expensive single mass exposure case on record in the U.S. occurred in 1994 when a kitten from a pet store in Concord, NH tested positive for rabies after a brief illness. As a result of potential exposure to this kitten or to other potentially rabid animals in the store, at least 665 persons received post-exposure rabies vaccinations at a total cost of more than \$1.1 million (Noah et al. 1995).

Rabies in raccoons was virtually unknown prior to the 1950’s. It was first described in Florida and spread slowly during the next three decades into Georgia, Alabama, and South Carolina. It was unintentionally introduced into the Mid-Atlantic States, probably by translocation of infected animals (Krebs et al. 1998). The first cases appeared in West Virginia and Virginia in 1977 and 1978. Since then raccoon rabies in the area expanded to form the most intensive rabies outbreak in the U.S. The strain is now enzootic in all of the eastern coastal states, as well as Alabama, Pennsylvania, Vermont, West Virginia, and most recently, parts of Ohio (Krebs et al. 2000). In the past 21 years, all of the mid-Atlantic and New England states have experienced at least one outbreak. The raccoon rabies epizootic front reached Maine in 1994, reflecting a movement rate of about 30-35 miles per year.

Raccoon rabies presents a human health threat through potential direct exposure to rabid raccoons, or indirectly through the exposure of pets or domestic livestock that have had an encounter with rabid raccoons. To date, there has been one known case of rabies in humans attributed to raccoon rabies. However, the number of pets and livestock examined and vaccinated for rabies, the number of diagnostic tests requested, and the number of post exposure treatments are all greater when raccoon rabies is present in the area. Human and financial resources allocated to rabies-related human and animal health needs also increase, often at the expense of other important activities and services.

The westward movement of the raccoon rabies front has slowed, probably in response to both natural geographic and man-made barriers. The Appalachian Mountains and perhaps river systems flowing eastward have helped confine the raccoon variant to the eastern U.S. If the “immune barrier” is breached by raccoon rabies, research suggests that raccoon populations are sufficient (Sanderson and Huber 1982, Glueck et al. 1988, Hasbrouck et al. 1992, Mosillo et al. 1999) for rabies to spread westward along a front at a rate similar to or greater than the rate at which this rabies strain has spread in the eastern U.S.

In Vermont the fox strain of rabies entered the state in 1992, but has not been confirmed since 1996. Raccoon rabies entered the state in 1994. Cases involving the raccoon strain have been recorded in all 14 counties. During 2004 there were 45 confirmed cases of rabies in Vermont (21 skunks, 15 raccoons, 7 foxes, 1 big brown bat and 1 woodchuck). During 2003 there were 38 confirmed cases of

rabies (19 raccoons, 14 skunks, 4 bats and 1 woodchuck), down from 91 confirmed cases (67 raccoon, 13 skunk, 2 bat, 2 cat, 2 red fox, 2 donkey, 1 gray fox, 1 horse and 1 cow) in 2002. Four of those cases confirmed in 2003 were type tested to be of the bat strain; all others were presumed raccoon strain. Although no domestic animals tested positive in 2004 and 2003; 2002 saw 6 positive cases involving livestock and pets.

Beaver activity in certain situations can become a threat to public health and safety (e.g., burrowing into or flooding of roadways and railroad beds can result in serious accidents) (Miller 1983, Woodward 1983). Increased water levels in urban areas resulting from beaver activity can lead to unsanitary conditions and potential health problems by flooding septic systems and sewage treatment facilities (DeAlmeida 1987, Loeb 1994). Beaver damming activity also creates conditions favorable to mosquitoes and can hinder mosquito control efforts or result in population increases of these insects (Wade and Ramsey 1986). While the presence of these insects is largely a nuisance, mosquitoes can transmit diseases, such as encephalitis (Mallis 1982) and West Nile Virus (CDC 2000). In addition, beaver are carriers of the intestinal parasite *Giardia lamblia*, which can contaminate human water supplies and cause outbreaks of the disease Giardiasis in humans (Woodward 1983, Beach and McCulloch 1985, Wade and Ramsey 1986, Miller and Yarrow 1994). The CDC have recorded at least 41 outbreaks of waterborne Giardiasis, affecting more than 15,000 people. Beaver are also known carriers of tularemia, a bacterial disease that is transmittable to humans through bites by insect vectors or infected animals or by handling animals or carcasses which are infected (Wade and Ramsey 1986). Skinner et al. (1984) found that in cattle-ranching sections of Wyoming the fecal bacterial count was much higher in beaver ponds than in other ponds, something that can be a concern to ranchers and recreationists. On rare occasions, beaver may contract the rabies virus and attack humans. In February 1999, a beaver attacked and wounded a dog and chased some children that were playing near a stream in Vienna, Virginia. Approximately a week later, a beaver was found dead at the site and tested positive for rabies (T. Meinke, WS, pers. comm., 2003).

1.3.2 Need for Mammal Damage Management at Airports

Wildlife creates a variety of problems at airports that can compromise safe aircraft operations. The most significant are the thousands of collisions that occur annually between wildlife and aircraft (Cleary and Dolbeer 1999). Wildlife strikes result in millions of dollars in direct and indirect damages. The cost of wildlife strikes to the civil aviation industry in the U.S. is estimated to be in excess of 534,361 hours/year of aircraft down time and \$469.8 million in monetary losses (Cleary et al. 2002).

Mammals create a serious threat to safe aircraft operations. WS is often contacted and asked to solve problems involving mammal damage issues in relation to human safety and property damage. At many airports there is the continuing risk of a mammal/aircraft strike which could result in human injury or death (Cleary and Dolbeer 1999). Mammals such as deer, moose, black bear, foxes, coyotes, raccoons, skunks and woodchucks venture onto airfields and become a direct threat to planes both landing and taking off. Burrowing mammals such as woodchucks and gophers pose an indirect risk to aircraft as they burrow under the runway potentially chewing sensor and flight control wires and/or eroding runway substrate making them susceptible to collapse. These activities have the potential to cause serious damage to aircrafts, health and human safety and high monetary losses resulting from the repair of such damage to runways.

Since 1985 the U.S. Air Force (USAF) has recorded more than 190 strikes that involved aircraft and mammals (Cleary and Dolbeer 1999). These strikes resulted in more than \$496,000 in damage. There are 125 registered airports in Vermont (Personal Communications, VAOT). Included in that number are two commercial air carrier airports (Burlington International and Rutland State), 13 public use (public owned) airports, 6 public use (private owned) airports, 96 private use (private owned) airports, 1 seaplane base, and 10 military heliports (Personal Communications, VAOT). According to the Federal Aviation Administration's National Wildlife Strike Database (Cleary et al. 2002 and online strike database <http://www.wildlife-mitigation.tc.faa.gov>), during 1990-2005 and personal communications with Vermont airport personnel, some of the reported mammal strikes in Vermont include an April 2004, an Air-National Guard F-16 strike of a coyote during take off at the Burlington International Airport, Burlington, VT, which

resulted in the replacement of a brake assembly costing \$17,000 (Personal Communications, United States Air Force). Morrisville-Stowe State Airport in Morrisville, Vermont reported a deer strike in 1998; no estimate of damage was given (WS Wildlife Hazard Assessment; May 2002). In October, 1999 at the William H. Morse State Airport in Bennington, Vermont, an aircraft hit a deer resulting in approximately \$120,000 worth of damage (English, aircraft accident reporting form, 1999). In the autumn of 2001, an aircraft struck a deer at Hartness State Airport in Springfield, VT causing \$2000 in damages (WS Wildlife Hazard Assessment; May 2002).

WS receives requests for assistance regarding mammal damage management at civil airports and military airfields in Vermont. These requests are considered serious because of the potential for loss of human life and because damage to aircraft can be extremely expensive. With the implementation of an Integrated MDM program in Vermont, WS could provide direct management and technical assistance at the request of aviation facilities in the State.

1.3.3 Need for Mammal Damage Management to Protect Agriculture

A number of mammal species cause damage to a variety of agricultural resources in Vermont. Losses related to commercial forestry, pastures, field crops, fruit, and livestock have been reported to WS. Monetary losses were not recorded in every instance, but more than \$1500 worth of damage was recorded from 1998 – 2002 (USDA-WS MIS Database 2004).

Beavers are reported to damage field crops, commercially grown standing timber and seedling trees (Hill 1982, Woodward 1983, Wade and Ramsey 1986, Miller and Yarrow 1994). Populations of this species are abundant in Vermont. Beaver are present in all 14 Vermont counties where appropriate habitat occurs (K.Royar, pers. comm., 2006). Beaver activities cause flooding of prime bottom land crop fields, costing farmers considerable dollar losses because of late planting dates or flooding of growing crops. Similar flooding and subsequent killing of trees occurs in some commercial forest tracts, killing harvestable trees or seedlings. In addition, feeding by beaver on bark, and felling of some trees results in the loss of stands of all age classes.

In Vermont, bear, deer and moose can cause damage (e.g. consumption of or trampled crops, destruction of apiaries, destruction of fencing and maple tubing) and/or cause predation losses or injury or threat of injury to livestock (e.g. sheep, pigs and horses). The Vermont Fish and Wildlife (VTFW) Game Wardens received over 700 bear complaints regarding damage to crops, apiaries, and threats to pigs, sheep and a horse. The VTFW reimburses citizens for damage caused by bear, deer and moose; when confirmed. In 2003, VTFW paid out \$14,000 in claims (Rooks, pers. communication, 2004). In 2003, Vermont State Game Wardens physically responded to 10 raccoon complaints, some of which involved predation of chickens, and 22 coyote complaints, most of which involved predation on sheep.

Bears, red foxes, gray foxes, and coyotes can cause predation losses or injury to livestock (e.g. sheep, goats, cattle, pigs, horses) and poultry (e.g. chickens, turkeys, geese ducks). Sheep and lamb losses from predators in the U.S. totaled 273,000 head and \$16.5 million during 1999 (NASS 2000). Coyotes accounted for 60.7% of these predator losses. In 2000, cattle and calf losses from predators in the U.S. totaled 147,000 head and \$51.6 million (NASS 2001). Coyotes were also the most commonly reported predator of goats in the U.S., accounting for 35.6% of predator losses (NASS 2000). The value of goats lost from all predators in the U.S. in 1999 was \$3.4 million. Cattle and calves are most vulnerable to predation at calving time and less vulnerable as they get older and larger (Horstman and Gunson 1982). Calves remain vulnerable to black bear predation during the spring through autumn if they are grazed in areas that typically represent suitable habitats for bears.

1.3.4 Need for Mammal Damage Management to Protect Natural Resources Including Threatened and Endangered Species

Natural resources may be described as those assets belonging to the public and often managed and held in trust by government agencies as representatives of the people. Such resources may be plants or animals, including threatened and endangered species, historic properties, or habitats in general. Examples of natural resources in Vermont are historic structures and places; parks and recreation areas; natural areas, including unique habitats or topographic features; threatened and endangered plants or animals; and any plant or animal populations which have been identified by the public as a natural resource.

Sometimes the activities of mammals cause damage to natural resources. This most frequently occurs in relation to plants or other animals, including but not limited to, trees, natural vegetation of other types, other mammals, and birds. Mammals causing damage are usually locally overabundant at the damage site, and threaten the welfare of a species population identified as a natural resource. Examples of this might be vegetation at a park which is being damaged by excessive browsing by overabundant white-tailed deer populations, or ground-nesting game bird populations which are being decimated by the presence of mammalian carnivores, such as raccoons, coyotes, or foxes.

Some of the species listed as threatened or endangered under the Endangered Species Act of 1973 are preyed upon or otherwise adversely affected by certain mammal species. In FY 2001, the WS nationwide program actively protected 144 Federal and State listed threatened and endangered species. More than 95 percent of these projects resulted in the increase or maintenance of local threatened and endangered species populations. Threatened and endangered species could be jeopardized by mammals in Vermont.

WS has received requests in the past for assistance in resolving damage caused to natural resources by mammals, and could be requested to provide services for management of damage to natural resources caused by any mammal at any location in Vermont. WS has provided assistance to VTFW in the removal of raccoons, foxes and skunks which were predating on the State threatened Spiny soft shelled turtle eggs.

1.3.5 Need for Mammal Damage Management to Protect Property

Mammals cause damage to a variety of property types in Vermont each year. During FY 1998-2002 complainants who contacted WS reported \$20,784 in damage by mammal species to all types of property in Vermont. Most significant damage was caused by deer to apple trees (\$8000) and voles to commercial nursery plants (\$7,000). Other damage was done by raccoons, skunks, beavers, moose and porcupine to a variety of resources including general property, residential buildings and human health and safety.

1.4 RELATIONSHIP TO OTHER ENVIRONMENTAL DOCUMENTS

ADC Programmatic Environmental Impact Statement. WS, previously called Animal Damage Control (ADC), has issued a Final EIS on the national APHIS/WS program (USDA 1997). Pertinent and current information available in the EIS has been incorporated by reference into this EA.

Environmental Assessment and Finding of No Significant Impact – Oral Vaccination to Control Specific Rabies Virus Variants in Raccoons, Gray Foxes, and Coyotes in the United States. This EA (USDA 2001) and its Finding of No Significant Impacts dated July 30, 2001 and August 5, 2002 analyzed the environmental effects of APHIS/WS involvement in the funding of and participation in Oral Rabies Vaccination programs to eliminate or stop the spread of raccoon rabies in a number of eastern states (including Vermont) and gray fox and coyote rabies in Texas. APHIS/WS determined the action would not have any significant impact on the quality of the human environment. Pertinent information from this document has been incorporated by reference into this EA.

1.5 WS RECORD KEEPING REGARDING REQUESTS FOR MAMMAL DAMAGE MANAGEMENT ASSISTANCE

WS maintains a Management Information System (MIS) database to document assistance that the agency provides in addressing wildlife damage conflicts. MIS data is limited to information that is collected from people who have requested services or information from Wildlife Services. It does not include requests received or responded to by local, State or other Federal agencies, and it is not a complete database for all wildlife damage occurrences. The number of requests for assistance does not necessarily reflect the extent of need for action, but this data does provide an indication that needs exists.

The database includes, but is not limited to, the following information: species of wildlife involved, the number of individuals involved in a damage situation; tools and methods used or recommended to alleviate the conflict; and the resource that is in need of protection. Table 1-1 provides a summary of mammal Technical Assistance requests to the Vermont WS program for Fiscal Years 1997-2005 (VT WS Management Information System 2006). A description of the WS Direct Control and Technical Assistance programs is contained in Chapter 3 of this EA.

Table 1-1*. Annual number of requests for technical assistance involving mammals to Vermont Wildlife Services during 1997-2005 (USDA-WS MIS Database 2006).

Fiscal Year	Agriculture	Human Health and Safety	Property	Natural Resources	Total
1997	54	693	1194	4	1945
1998	43	1044	1052	0	2139
1999	41	1184	1177	0	2402
2000	60	1129	1102	1	2292
2001	61	1173	936	9	2179
2002	39	1297	834	7	2177
2003	49	1016	663	2	1730
2004	57	929	513	12	1511
2005	33	802	352	6	1193
* Total	437	9267	7823	41	17,568

Data presented in this table were taken from the VT WS Management Information System (MIS).

1.6 PROPOSED ACTION

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) proposes to continue the current damage management program that responds to mammal damage in the State of Vermont. An Integrated Wildlife Damage Management (IWDM) approach would be implemented to reduce mammal damage to property, agricultural resources (including livestock), natural resources, and human/public health and safety. Damage management would be conducted on public and private property in Vermont when the resource owner (property owner) or manager requests assistance. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification or harassment would be recommended and utilized to reduce damage. In other situations, mammals would be removed as humanely as possible using: shooting, trapping, snaring, and FDA or EPA approved chemical products. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or could include instances where application of lethal methods alone would be the most appropriate strategy.

Mammal damage management activities would be conducted in the State, when requested and funded, on private or public property, including airport facilities and adjacent or nearby properties, after an *Agreement for Control* or other comparable document has been completed. All management activities would comply with appropriate Federal, State, and Local laws, including applicable laws and regulations authorizing the take of mammals in Vermont.

1.7 DECISION TO BE MADE

Based on the scope of this EA, the decisions to be made are:

- Should WS implement an integrated mammal damage management strategy, including technical assistance and direct control, to meet the need for mammal damage management in Vermont?
- If not, should WS attempt to implement one of the alternatives to an integrated mammal damage management strategy as described in the EA?
- Would the proposed action have significant impacts on the quality of the human environment, requiring preparation of an EIS?

1.8 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT ANALYSIS

1.8.1 Actions Analyzed

This EA evaluates mammal damage management by WS to protect: 1) property; 2) agricultural resources; 3) natural resources; and 4) public/human health and safety in Vermont. Protection of other resources or other program activities would be addressed in other NEPA analysis, as appropriate.

1.8.2 American Indian Lands and Tribes

Currently, Vermont WS does not have any MOUs with any American Indian tribes. If WS enters into an agreement with a tribe for MDM, this EA would be reviewed and supplemented, if appropriate, to insure compliance with NEPA. MOUs, agreements and NEPA documentation would be prepared as appropriate before conducting MDM on tribal lands.

1.8.3 Period for which this EA is Valid

This EA would remain valid until the WS program in Vermont and other appropriate agencies determine that new needs for action, changed conditions or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document would be supplemented pursuant to NEPA. Review of the EA would be conducted each year to ensure that the EA is sufficient.

1.8.4 Site Specificity

This EA analyzes the potential impacts of MDM and addresses activities on all lands in Vermont under MOUs, Cooperative Agreements and in cooperation with the appropriate public land management agencies. It also addresses the impacts of MDM on areas where additional agreements may be signed in the future. Because the proposed action is to reduce damage and because the program's goals and directives are to provide services when requested, within the constraints of available funding and workforce, it is conceivable that additional MDM efforts could occur. Thus, this EA anticipates this potential expansion and analyzes the impacts of such efforts as part of the program.

Planning for the management of mammal damage must be viewed as being conceptually similar to federal or other agency actions whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and locations where they will occur are unknown but could be anywhere in

a defined geographic area. Examples of such agencies and programs include fire and police departments, emergency clean-up organizations, insurance companies, etc. Although some of the sites where mammal damage will occur can be predicted, all specific locations or times where such damage will occur in any given year cannot be predicted. This EA emphasizes major issues as they relate to specific areas whenever possible, however, many issues apply wherever mammal damage and resulting management occurs, and are treated as such. The standard WS Decision Model (Slate et al. 1992) would be the site-specific procedure for individual actions conducted by WS in Vermont (see Chapter 3 for a description of the Decision Model and its application).

The analyses in this EA are intended to apply to any action that may occur *in any locale* and at *any time* within the State of Vermont. In this way, APHIS-WS believes it meets the intent of NEPA with regard to site-specific analysis and that this is the only practical way for WS to comply with NEPA and still be able to accomplish its mission.

1.8.5 Summary of Public Involvement

Issues related to the proposed action were initially developed by WS. Issues were defined and preliminary alternatives were identified. As part of this process, and as required by the Council on Environmental Quality (CEQ 1981) and APHIS-NEPA implementing regulations, this document and its Decision are being made available to the public through "Notices of Availability" (NOA) published in local media and through direct mailings of NOA to parties that have specifically requested to be notified. New issues or alternatives raised after publication of public notices will be fully considered to determine whether the EA and its Decision should be revisited and, if appropriate, revised.

1.9 PREVIEW OF THE REMAINDER OF THIS EA

The remainder of this EA is composed of four (4) chapters and seven (7) appendices. Chapter 2 discusses and analyzes the issues and affected environment. Chapter 3 contains a description of each alternative, alternatives not considered in detail and standard operating procedures (SOP). Chapter 4 analyzes environmental consequences and the environmental impacts associated with each alternative considered in detail. Chapter 5 contains the list of preparers and those consulted during this EA process. Appendix A is a list of the literature cited during the preparation of the EA and Appendix B is a detailed description of the methods used for MDM in Vermont. Appendices C-F are comprehensive lists of Federal and VT T&E species and correspondence with the VTFW and FWS regarding T&E species. Appendix G is the Criteria for Beaver Dam Breaching/Removal.

CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT

2.0 INTRODUCTION

Chapter 2 contains a discussion of the issues, including issues that received detailed environmental impact analysis in Chapter 4 (Environmental Consequences), issues used to develop SOPs, and issues not considered in detail, with the rationale. Pertinent portions of the affected environment are included in this chapter and in the discussion of issues used to develop SOPs. Additional affected environments are incorporated into the discussion of the environmental impacts in Chapter 4 and the description of the proposed program in Chapter 3.

2.1 AFFECTED ENVIRONMENT

Upon request for assistance, mammal damage management could be conducted on private, federal, state, tribal, county, and municipal lands in Vermont to protect agricultural and natural resources, property, and public/human health and safety. Areas of the proposed action could include, but are not limited to, state, county, municipal and federal natural resource areas, park lands, and historic sites; state and interstate highways and roads; railroads and their right-of-ways; property in or adjacent to subdivisions, businesses, and industrial parks; timberlands, croplands, and pastures; private and public property where burrowing mammals cause damage to structures, dikes, ditches, ponds, and levees; public and private properties in rural/urban/suburban areas where mammals cause damage to landscaping and natural resources, property, and are a threat to human safety through the spread of disease. The area of the proposed action would also include airports and military airbases where mammals are a threat to human safety and to property; areas where mammals negatively impacts wildlife, including T&E species; and public property where mammals are negatively impacting historic structures, cultural landscapes and natural resources.

The “Environmental Status Quo” for managing damage and conflicts associated with State managed or unprotected wildlife species. As defined by NEPA implementing regulations, the “*human environment* shall be interpreted comprehensively to include the natural and physical environment *and the relationship of people with that environment.*” (40 CFR 1508.14). Therefore, when a federal action agency analyzes its potential impacts on the “human environment,” it is reasonable for that agency to compare not only the effects of the federal action, but also the potential impacts that occur or will occur in the absence of the federal action. This concept is applicable to situations involving federal assistance in managing damage associated with State-resident wildlife species or unprotected wildlife species.

Unprotected wildlife species, such as most non-native invasive species, are not protected under state or federal law. Most State-resident wildlife species are managed under State authority or law without any federal oversight or protection. In some states, with the possible exception of restrictions on methods (e.g., firearms restrictions, pesticide regulations), unprotected wildlife species and certain resident wildlife species are managed with little or no restrictions allowing them to be killed or taken by anyone at any time. For mammal damage management in Vermont, the VTFW has the authority to manage and authorize the taking of mammals for damage management purposes (*see* Section 1.1).

When a non-federal entity (i.e. State wildlife agencies, State agriculture agencies, State health agencies, municipalities, counties, private companies, individuals, etc.) takes a management action on a State-resident wildlife species or unprotected wildlife species, the action is not subject to NEPA compliance due to the lack of federal involvement in the action. Under such circumstances, the environmental *baseline* or *status quo* must be viewed as an environment that includes those species *as they are managed or impacted by non-federal entities in the absence of the federal action being proposed*. Therefore, in those situations in which a non-federal entity has decided that a management action directed towards a state protected or unprotected wildlife species will occur and even the particular methods that will be used, WS's involvement in the action will not affect the *environmental status quo*. WS's decision-making ability is restricted to one of two alternatives - either taking the action using the specific methods as decided upon by the non-federal entity, or taking no action at all at which point the non-federal entity will take the same action anyway.

The inability to change the *environmental status quo* in the types of situations described above presents a clear question of whether there is enough federal control over the action to be taken to make direct assistance by WS a federal action requiring compliance with the National Environmental Policy Act. This lack of federal control over the decision to be made is even clearer when the non-federal entity has committed to taking the same actions in the absence of any federal assistance from WS. Clearly, under these circumstances, by any analysis we can envision, WS would have virtually no ability to affect the *environmental status quo* by selecting any possible alternative, even the alternative of no federal action by WS.

Therefore, based on the discussion above, it is clear that in those situations where a non-federal cooperator has obtained the appropriate VTFW permit or authority, and has already made the decision to remove or otherwise manage a specific mammal species to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, however, certain aspects of the human environment may actually benefit more from WS's involvement than from a decision not to assist. For example, if a cooperator believes WS has greater expertise to selectively remove a target species than a non-WS entity; WS management activities may have less of an impact on target and non-target species than if the non-federal entity conducted the action alone. Thus, in those situations, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

2.2 ISSUES ANALYZED IN DETAIL IN CHAPTER 4

The following issues have been identified as areas of concern requiring consideration in this EA. These will be analyzed in detail in Chapter 4:

- Effects on target mammal species
- Effects on other wildlife species, including T&E species
- Effects on human health and safety
- Impacts to stakeholders, including aesthetics
- Humaneness and animal welfare concerns of methods used
- Effects on wetlands

2.2.1 Effects on Target Mammal Species

Of interest to WS, program recipients, decision-makers, and members of the public is whether wildlife damage management actions adversely affect the viability of target species populations. The target species selected for analysis in this EA are beaver (*Castor canadensis*), red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), woodchuck (*Marmota monax*), white-tailed deer (*Odocoileus virginianus*), moose (*Alces alces*), black bear (*Ursus americanus*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), otter (*Lontra canadensis*), mink (*Mustela vison*), muskrat (*Ondatra zibethicus*), and porcupine (*Erethizon dorsatum*).

2.2.2 Effects on Other Wildlife Species, including T&E Species

WS and the rest of the wildlife management profession, as well as the public, are concerned about whether the proposed action or any of the alternatives might result in adverse impacts to populations of other wildlife, especially T&E species. WS' SOPs are designed to reduce the effects on non-target species' populations and are presented in Chapter 3. To reduce the risks of adverse affects to non-target species, WS would select damage management methods that are target-selective or apply such methods in ways to reduce the likelihood of capturing or killing non-target species.

Threatened and Endangered species lists for the USFWS and State of Vermont were reviewed to identify potential effects on federal and state listed T&E species. Special efforts are made to avoid jeopardizing

T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. WS has consulted with the USFWS under Section 7 of the ESA concerning potential effects of MDM methods on T&E species and has obtained a Biological Opinion (B.O.). For the full context of the B.O., see Appendix F of the ADC FEIS (USDA 1997). WS also consulted with the FWS VT Field Office under Section 7 during this EA process, to ensure that potential effects on T&E species were adequately addressed (correspondence in Appendix D).

2.2.3 Effects on Human Health and Safety

Safety and efficacy of chemical control methods.

The public is sometimes concerned about chemicals used in mammal damage management programs because of potential adverse effects on people from being exposed either to the chemicals directly or to mammals that have died as a result of the chemical use. Under the alternatives proposed in this EA, chemical use is regulated by the EPA through FIFRA, by Vermont State Pesticide Control Laws, by DEA, by FDA and by WS Directives. Based on a thorough Risk Assessment, APHIS concluded that when WS program chemicals are used according to label directions, they are selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997, Appendix P).

The use of explosives for beaver dam removal can be a sensitive issue with the inexperienced public. WS personnel that use explosives are required to take and pass in-depth training, and must be able to demonstrate competence and safety in their use of explosives. WS personnel adhere to WS policies, as well as regulations from the Bureau of Alcohol, Tobacco and Firearms (ATF), the Occupational Safety and Health Administration (OSHA), and the U.S. Department of Transportation (USDOT) with regards to explosives use, storage, and transportation. WS uses binary explosives which require two components to be mixed before they can be actuated, which virtually eliminates the hazard of accidental detonation during storage and transportation. Storage and transportation of mixed binary explosives is illegal. When explosives are used, signs are placed to stop public entry and other safety measures are taken to avoid public exposure to explosives. Therefore, no adverse effects to public safety are expected from the use of explosives by WS under any alternative.

Other individuals may have concerns that there is a potential for drugs used in animal capture, handling, and euthanasia to cause adverse health effects in humans that hunt and eat the species involved. Among the species to be captured and handled under the proposed action, this issue is expected to only be of concern for wildlife which are hunted and sometimes consumed by people as food.

Impacts on human safety of non-chemical MDM methods

Some people may be concerned that WS's use of firearms, traps, snares and pyrotechnic scaring devices could cause injuries to people. WS personnel occasionally use traps, snares and firearms to remove or scare mammals that are causing damage. WS may use pyrotechnics in noise harassment programs to disperse or move mammals. There is some potential fire hazard to agricultural sites and private property from pyrotechnic use.

Firearm use is a very sensitive public concern because of safety relating to the public and the threat of misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). WS employees who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

The use of restraining traps such as foothold or body-grip traps; or snares is a sensitive issue because of the lack of understanding and experience by the public in using these devices. Some people believe they could be captured and restrained by these traps. Some believe these traps indiscriminately and automatically capture people who may unknowingly approach locations where these traps or snares are placed. When conducting activities that require using such devices, WS personnel provide information about the techniques used to the appropriate landowners or land management personnel. WS is assisting with the development of Best Management Practices (BMP's) for improving traps and trapping programs in the United States. These BMP's evaluate the animal welfare and efficiency of various traps for species which can be legally harvested in North America.

Impacts on human health and safety from mammals

The concern stated here is that the absence of adequate MDM would result in adverse effects on human health and safety, because mammal damage would not be curtailed or reduced to the minimum levels possible and practical. The potential impacts of not conducting such work could lead to increased incidence of injuries, illness, or loss of human lives.

WS assists airport management who seek to resolve wildlife hazards to aviation. Airport managers and air safety officials are concerned that the absence of a WS MDM program could lead to a failure to adequately address complex wildlife hazard problems faced by the aviation community. Hence, potential effects of not conducting such work could lead to an increased incidence of human injuries or loss of life due to mammal strikes to aircraft.

2.2.4 Impacts to Stakeholders, including Aesthetics

Aesthetics is a philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics is subjective in nature and is dependent on what an observer regards as beautiful. The human attraction to animals has been well documented throughout history and started when humans began domesticating animals. The American public is no exception, and today a large percentage of households have pets. However, some people may consider individual wild animals and birds as "pets" or exhibit affection toward these animals, especially people who enjoy coming in contact with wildlife. Therefore, the public reaction is variable and mixed to wildlife damage management because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to reduce conflicts/problems between humans and wildlife.

There may be some concern that the proposed action or alternatives would result in the loss of aesthetic benefits to the public, resource owners, or neighboring residents. Wildlife generally is regarded as providing economic, recreational, and aesthetic benefits (Decker and Goff 1987), and the mere knowledge that wildlife exists is a positive benefit to many people. Wildlife populations provide a range of social and economic benefits (Decker and Goff 1987). These include direct benefits related to consumptive and non-consumptive use (e.g., wildlife-related recreation, observation, harvest, sale), indirect benefits derived from vicarious wildlife related experiences (e.g., reading, television viewing), and the personal enjoyment of knowing wildlife exists and contributes to the natural ecosystems (e.g., ecological, existence, bequest values) (Bishop 1987).

Direct benefits are derived from a user's personal relationship to animals and may take the form of direct consumptive use (using the animal or intending to) or non-consumptive use (viewing the animal in nature or in a zoo, photography) (Decker and Goff 1987). Indirect benefits or indirect exercised values arise without the user being in direct contact with the animal and come from experiences such as looking at photographs and films of wildlife, reading about wildlife, or benefiting from activities or contributions of animals such as their use in research (Decker and Goff 1987). Indirect benefits come in two forms: bequest

and pure existence (Decker and Goff 1987). Bequest is providing for future generations and pure existence is merely knowledge that the animals exist (Decker and Goff 1987).

Many people, directly affected by problems and threats to public health or safety associated with mammals, insist upon their removal from the property or public location when they cause damage. Some members of the public have an idealistic view and believe that all wildlife should be captured and relocated to another area to alleviate damage or threats to public health or safety. Others, directly affected by the problems caused by wildlife, strongly support removal. Individuals not directly affected by the harm or damage caused by wildlife may be supportive, neutral, or totally opposed to any removal of wildlife from specific locations or sites. Those totally opposed to mammal damage management want WS to teach tolerance for damage and threats to public health or safety, and that wildlife should never be killed. Some people would strongly oppose removal of mammals regardless of the amount and type of damage. Some members of the public who oppose removal of wildlife do so because of human-affectionate bonds with individual wildlife. These human-affectionate bonds are similar to attitudes of a pet owner and result in aesthetic enjoyment.

The WS program in Vermont only conducts wildlife damage management at the request of the affected property owner or resource manager. If WS received requests from an individual or official for MDM, WS would address the issues/concerns and consideration would be made to explain the reasons why the individual damage management actions would be necessary. Management actions would be carried out in a caring, humane, and professional manner.

2.2.5 Humaneness and Animal Welfare Concerns of Methods Used

The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife is an important but very complex concept that can be interpreted in a variety of ways. Schmidt (1989) indicated that vertebrate pest damage management for societal benefits could be compatible with animal welfare concerns, if " . . . *the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process.*"

According to the AVMA (1987), suffering is described as a " . . . *highly unpleasant emotional response usually associated with pain and distress.*" However, suffering " . . . *can occur without pain . . .*," and " . . . *pain can occur without suffering . . .*". Because suffering carries with it the implication of a time frame, a case could be made for " . . . *little or no suffering where death comes immediately . . .*" (CDFG 1991), such as shooting.

Defining pain as a component in humaneness of WS methods appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would " . . . *probably be causes for pain in other animals . . .*" (AVMA 1987). However, pain experienced by individual animals probably ranges from little or no pain to considerable pain (CDFG 1991).

Pain and suffering, as it relates to WS damage management methods, has both a professional and lay point of arbitration. Wildlife managers and the public would be better served to recognize the complexity of defining suffering, since " . . . *neither medical nor veterinary curricula explicitly address suffering or its relief*" (CDFG 1991). Research suggests that some methods, such as restraint in leg-hold traps or changes in the blood chemistry of trapped animals, indicate "stress" (USDA 1997). However, such research has not yet progressed to the development of objective, quantitative measurements of pain or stress for use in evaluating humaneness.

The AVMA states "... *euthanasia is the act of inducing humane death in an animal*" and "... *the technique should minimize any stress and anxiety experienced by the animal prior to unconsciousness.*" (Beaver et al. 2001). Some people would prefer AVMA accepted methods of euthanasia to be used when killing all animals, including wild and feral animals. The AVMA states that "*For wild and feral animals, many of the recommended means of euthanasia for captive animals are not feasible. In field circumstances, wildlife*

biologists generally do not use the term euthanasia, but terms such as killing, collecting, or harvesting, recognizing that a distress-free death may not be possible.” (Beaver et al. 2001).

The decision-making process involves tradeoffs between the above aspects of pain and humaneness. Therefore, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of animal suffering within the constraints imposed by current technology and funding.

WS has improved the selectivity and humaneness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some MDM methods are used in situations where nonlethal damage management methods are not practical or effective.

Vermont WS personnel are experienced and professional in their use of wildlife damage management methods, so that they are as humane as possible under the constraints of current technology, workforce and funding. SOPs used to maximize humaneness are listed in Chapter 3.

2.2.5.1 Humaneness of Using Drowning Sets for Euthanizing Beavers

Some are concerned about beaver that drown while restrained by foothold traps and these people consider drowning inhumane. There is considerable debate and disagreement among animal interest groups, veterinarians, wildlife professionals, fur trappers, and nuisance wildlife control specialists on this issue. The debate centers on an uncertainty as to whether the drowning animals are rendered unconscious by high levels of carbon dioxide (CO₂) and are thus insensitive to distress and pain (Ludders et al. 1999). The AVMA identifies drowning as an unacceptable method of euthanasia (Beaver et al. 2001), but provides no literature citations to support this position. Ludders et al. (1999) concluded drowning is not euthanasia based on the animals not dying from CO₂ narcosis and reported CO₂ narcosis does not occur until 95 millimeters of mercury in arterial blood is exceeded. Ludders et al. (1999) showed death during drowning is from hypoxia and anoxia, and thus animals experience hypoxemia and concluded that animals that drown are distressed because of stress related hormones, epinephrine and norepinephrine, and therefore drowning is not euthanasia.

CO₂ causes death in animals by hypoxemia and some animals (cats, rabbits, and swine) are distressed before death (Beaver et al. 2001). Even though these animals are distressed, the AVMA (Beaver et al. 2001) states this death is an acceptable form of euthanasia. Thus, the AVMA does not preclude distress or pain in euthanasia. In fact, the AVMA supports inducing hypoxemia related distress when necessary to reduce total distress, because reducing total distress is a more humane death.

Death by drowning in the classical sense is caused by the inhalation of fluid into the lungs and is referred to as “wet” drowning (Gilbert and Gofton 1982, Noonan 1998). Gilbert and Gofton (1982) reported that all submerged beaver do not die from wet drowning, but die of CO₂ induced narcosis, and the AVMA has stated the use of CO₂ is acceptable (Gilbert and Gofton 1982, Noonan 1998). Gilbert and Gofton (1982) reported that after beaver were trapped and entered the water, they struggled for 2-5 minutes followed by a period of reflexive responses. Andrews et al. (1993) stated that with some techniques that induce hypoxia, some animals have reflex motor activity followed by unconsciousness that is not perceived by the animal. Gilbert and Gofton (1982) stated it is unknown how much conscious control actually existed at this stage and they stated anoxia may have removed much of the sensory perception by 5-7 minutes post submersion.

However, Gilbert and Gofton (1982) have been criticized because levels of carbon dioxide in the blood were not reported (Ludders et al. 1999) and there was insufficient evidence that the beaver in their study were under a state of CO₂ narcosis when they died (V. Nettles, Southeastern Cooperative Wildlife Disease Study, letter to W. MacCallum, Massachusetts Division of Fisheries and Wildlife,

June 15, 1998). Adding to the controversy, Clausen and Ersland (1970) did measure CO₂ in the blood for submersed restrained beaver, yet none of the beaver in their study died, so Clausen and Ersland (1970) could not determine if beavers die of CO₂ narcosis. Clausen and Ersland (1970) demonstrated that CO₂ increased in arterial blood while beaver were submersed and CO₂ was retained in the tissues. While Clausen and Ersland (1970) did measure the amounts of CO₂ in the blood of submersed beaver they did not attempt to measure the analgesic effect of CO₂ buildup to the beaver (letter from V. Nettles, D.V.M., Ph.D., Southeastern Cooperative Wildlife Disease Study to W. MacCallum, MA Division of Fisheries and Wildlife, June 15, 1998).

When beaver are trapped using foothold traps with intent to “drown”, the beaver are exhibiting a flight response. Gracely and Sternberg (1999) report that there is stress-induced analgesia resulting in reduced pain sensitivity during fight or flight responses. Environmental stressors that animals experience during flight or fight activate the same stress-induced analgesia (Gracely and Sternberg 1999).

The use of drowning trap sets has been a traditional wildlife management technique in trapping aquatic mammals such as beaver and muskrats. Trapper education manuals and other wildlife damage management manuals written by wildlife biologists recommend drowning sets for foothold traps set for beaver (Bromley et al. 1994, Dolbeer et al. 1994, Howard et al. 1980, Miller and Yarrow 1994, Randolph 1988). In some situations drowning trap sets are the most appropriate and efficient method available to capture beaver. For example, a drowning set attachment should be used with foothold traps when capturing beaver to prevent the animal from injuring themselves while restrained, or from escaping (Miller and Yarrow 1994). Animals that drown die relatively quickly (e.g., within minutes) versus the possible stress of being restrained and harassed by people, dogs, and other wildlife before being euthanized. Drowning sets make the captured animal and trap less visible and prevents injury from the trapped animal (i.e., bites and scratches) to people who may otherwise approach a restrained animal. Furthermore, some people may be offended by the sight of dead animals. Drowning places the dead animal out of public view. Some sites may be unsuitable for body-gripping traps or snares because of unstable banks, deep water, or a marsh with a soft bottom (a.k.a., muck), but these sites would be suitable for foothold traps.

Given the short time period of a drowning event, the possible analgesic effect of CO₂ buildup, the minimum if any pain or distress on drowning animals, the AVMA’s acceptance of hypoxemia as euthanasia and the AVMA’s acceptance of a minimum of pain and distress during euthanasia, the acceptance of catching and drowning muskrats approved by International Humane Trapping Standards (Fur Institute of Canada 2000), we conclude that drowning, though rarely used by WS, is acceptable. We recognize some people will disagree and are unswayed by WS decision to continue the use of this method.

2.2.6 Effects on Wetlands

Some members of the public may be concerned about possible effects to wetlands which might occur as a result of WS MDM programs. Beaver dam removals during programs to manage damage caused by beavers sometimes occur in wetland-like habitat, or in areas inundated by water resulting from flooding by this species’ activities.

Beavers build dams primarily in smaller riverine wetlands or wetland-like habitats (intermittent and perennial streams and creeks). Dam material usually consists of mud, sticks, and other vegetative material. Their dams obstruct the normal flow of water and typically change the preexisting wetlands’ hydrology from flowing or circulating waters to slower, deeper, more expansive waters that accumulate bottom sediment. The depth of the bottom sediment depends on the length of time an area is covered by water, and the amount of suspended sediment in the water.

Beaver dams, in time, can establish new, but different wetlands. The U.S. Army Corps of Engineers and the Environmental Protection Agency’s regulatory definition of a wetland (40 CFR 232.2) is:

Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

The preexisting habitat and the altered habitat have different ecological values to the fish and wildlife native to the area. Some species will abound by the addition of a beaver dam, while others will diminish. For example, some species of darters listed as federally endangered require fast moving waters over gravel or cobble beds which beaver dams can eliminate, thus reducing the habitat's value for these species. In areas where bottomland forests are flooded by beaver, if left unchecked, a change in species composition over time will occur. Hardwood trees are killed from flooding and mast production declines. Conversely, beaver dams can potentially be beneficial to some wildlife such as river otter, neotropical birds and waterfowl.

If a beaver dam is not removed and water is allowed to stand, hydric soils and hydrophytic vegetation eventually form. This process can take anywhere from several months to years depending on preexisting conditions. Hydric soils are those soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions. In general, hydric soils form much easier where wetlands have preexisted. Hydrophytic vegetation includes those plants that grow in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. If these conditions are met, then a wetland has developed that will have different wildlife habitat values than an area that has been more recently impounded by beaver dam activity.

The intent of most dam removal operations is not to drain old established wetlands. With few exceptions, requests from public and private individuals and entities that WS receives involve dam removal to return an area to the condition that existed before the dam had been built, or before it had been affecting the area for more than a few years. Wildlife Services beaver damage management activities are primarily conducted to address damage to agricultural crops, timber resources, public property such as roads and bridges, and water management structures. Beaver dam removal activities are conducted primarily on small watershed streams, tributary drainages and ditches. These activities can be described as small, exclusive projects conducted to restore water flow through previously existing channels.

In the majority of instances, beaver dam removal is accomplished by manual methods. Nationwide, during the Fiscal Year 1998 to 2005 time period WS personnel breached 787 beaver dams by hand using manual methods (USDA-WS MIS Database 2002). In some instances binary explosives are utilized to breach dams. WS personnel used binary explosives to breach 100 dams from FY 1998-2002 (USDA-WS MIS Database 2002). WS personnel do not utilize heavy equipment such as trackhoes or backhoes for beaver dam removal. Only the portion of the dam blocking the stream or ditch channel is breached. In some instances, WS activities involve the installation of structures to manage water levels at the site of a breached beaver dam.

If the area does not have hydric soils, it usually takes many years for them to develop and a wetland to become established; this often takes greater than 5 years as indicated by the Swampbuster provision of the Food Security Act. Most beaver dam removal by WS is allowed under exemptions stated in 33 CFR parts 323 and 330 of Section 404 of the Clean Water Act or parts 3821 and 3822 of the Food Security Act. However, the removal of some beaver dams can trigger certain portions of Section 404 that require landowners to obtain permits from the Corps of Engineers prior to removing a blockage. WS personnel determine the proper course of action upon inspecting a beaver dam impoundment. Appendix G describes the procedures used by WS to assure compliance with the pertinent laws and regulations.

2.3 ISSUES NOT CONSIDERED IN DETAIL WITH RATIONALE

2.3.1 No Wildlife Damage Management at Taxpayer Expense; Wildlife Damage Management should be Fee Based

Funding for WS comes from a variety of sources in addition to federal appropriations. In Vermont, funds to implement wildlife damage management activities and programs are derived from a number of sources, including, but not limited to Federal, state, county and municipal governments/agencies, private organizations, corporations and individuals, homeowner/property owner associations, and others, under Cooperative Service Agreements and/or other contract documents and processes. Federal, state, and local officials have decided that wildlife damage management should be conducted by appropriating funds. WS was established by Congress as the agency responsible for providing wildlife damage management to the people of the United States. Wildlife damage management is an appropriate sphere of activity for government programs, since aspects of wildlife damage management are a government responsibility and authorized and directed by law.

2.3.2 Mammal Damage Should be Managed by Private Nuisance Wildlife Control Agents

Private nuisance wildlife control agents could be contacted to reduce mammal damage for property owners or property owners could attempt to reduce their own damage problems. Some property owners would prefer to use a private nuisance wildlife control agent because the nuisance wildlife agent is located in closer proximity and thus could provide the service at less expense, or because they prefer to use a private business rather than a government agency. However, some property owners would prefer to contract with a government agency. In particular, large industrial businesses and cities and towns may prefer to use WS because of security and safety issues and reduced administrative burden.

2.3.3 Appropriateness of Preparing an EA (Instead of an EIS) for Such a Large Area

Some individuals might question whether preparing an EA for an area the size of the State of Vermont would meet the NEPA requirements for site specificity. If in fact a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared. In terms of considering cumulative impacts, one EA analyzing impacts for the entire State may provide a better analysis than multiple EAs covering smaller zones. In addition, the WS program in Vermont only conducts MDM on a relatively small area of the State where damage is occurring or likely to occur.

2.3.4 Wildlife Damage is a Cost of Doing Business — a “Threshold of Loss” Should Be Established Before Allowing Any Lethal MDM

WS is aware that some people feel Federal wildlife damage management should not be allowed until economic losses reach some arbitrary predetermined threshold level. Such policy, however, would be difficult or inappropriate to apply to human health and safety situations. Although some damage can be tolerated by most resource owners, resource owners and situations differ widely and a set wildlife damage threshold levels would be difficult to determine or justify. WS has the legal direction to respond to requests for assistance, and it is program policy to aid each requester to minimize losses. WS uses the Decision Model thought process discussed in Chapter 3 to determine appropriate strategies.

In a ruling for Southern Utah Wilderness Alliance, et al. vs. Hugh Thompson, Forest Supervisor for the Dixie National Forest, et al., the United States District Court of Utah denied plaintiffs' motion for preliminary injunction. In part the court found that a forest supervisor needs only show that damage from wildlife is threatened, to establish a need for wildlife damage management (Civil No. 92-C-0052A January 20, 1993). Thus, there is judicial precedence indicating that it is not necessary to establish a criterion such as percentage of loss of a particular resource to justify the need for wildlife damage management actions.

2.3.5 Effectiveness of Mammal Damage Management Methods

A concern among members of the public is whether the methods of reducing mammal damage will be effective in reducing or alleviating damage and conflicts. The effectiveness of each method or methods can be defined in terms of decreased potential for health risks, decreased human safety hazards, reduced property damage, reduced agricultural damage, and reduced natural resource damage. In terms of the

effectiveness of a specific method or group of methods, this would not only be based on the specific method used, but more importantly upon the skills and abilities of the person implementing the control methods and the ability of that person to determine the appropriate course of action to take. It would be expected that the more experience a person has in addressing mammal damage conflicts and implementing control methods the more likely they would be successful reducing damage to acceptable levels. WS technical assistance program provides information to assist persons in implementing their own MDM program, but at times the person receiving WS technical assistance may not have the skill or ability to implement the MDM methods recommended by WS. Therefore, it is more likely that a specific MDM method or group of methods would be effective in reducing damage to acceptable levels when WS professional wildlife damage assistance is provided than that would occur when the inexperienced person attempts to conduct MDM activities.

CHAPTER 3: ALTERNATIVES

3.0 INTRODUCTION

Alternatives were developed for consideration using the WS Decision Model (Slate et al. 1992) as described in Chapter 2 (pages 20-35), Appendix J (Methods of Control), Appendix N (Examples of WS Decision Model), and Appendix P (Risk Assessment of Wildlife Damage Control Methods Used by USDA, Wildlife Services Program) of the ADC FEIS (USDA 1997).

The No Action alternative is a procedural NEPA requirement (40 CFR 1502), is a viable and reasonable alternative that could be selected, and serves as a baseline for comparison with the other alternatives. The No Action alternative, as defined here, is consistent with the Council on Environmental Quality's (CEQ's) definition (CEQ 1981).

Alternatives analyzed in detail are:

- Alternative 1: Technical Assistance Only
- Alternative 2: Integrated Mammal Damage Management Program. (Proposed Action/No Action)
- Alternative 3: Non-lethal Mammal Damage Management Only By WS
- Alternative 4: No federal WS Mammal Damage Management

3.1 DESCRIPTION OF THE ALTERNATIVES

3.1.1 Alternative 1: Technical Assistance Only

This alternative would not allow for WS operational MDM in Vermont. WS would only provide technical assistance and make recommendations when requested. Producers, property owners, agency personnel, corporations, or others could conduct MDM using any legal lethal or non-lethal method available to them. Property owners and land managers could implement their own mammal damage management program, use contractual services of private businesses, use volunteer services, or take no action. This alternative would place the immediate burden of operational damage management work on the property owners and other federal, state, or county agencies.

3.1.2 Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

The United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services proposes to continue the current damage management program that responds to mammal damage in the State of Vermont. An IWDM approach would be implemented to reduce mammal damage to property, agricultural resources (including livestock), natural resources, and human/public health and safety. Damage management would be conducted on public and private property in Vermont when the resource owner (property owner) or manager requests assistance. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification or harassment would be recommended and utilized to reduce damage. In other situations, mammals would be removed as humanely as possible using: shooting, trapping, snaring, and FDA or EPA approved chemical products. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or could include instances where application of lethal methods alone would be the most appropriate strategy.

Mammal damage management activities would be conducted in the State, when requested and funded, on private or public property, including airport facilities and adjacent or nearby properties, after an *Agreement for Control* or other comparable document has been completed. All management activities would comply with appropriate Federal, State, and Local laws, including applicable laws and regulations authorizing the take of mammals in Vermont.

3.1.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS

This alternative would require WS to use non-lethal methods only to resolve mammal damage problems. Information on lethal MDM methods would still be available to producers and property owners through other sources such as USDA Agricultural Extension Service offices, VTDFW, universities, or pest control organizations. Requests for information regarding lethal management approaches would be referred to VTDFW, local animal control agencies, or private businesses or organizations. Individuals might choose to implement WS non-lethal recommendations, implement lethal methods or other methods not recommended by WS, contract for WS direct control services, use contractual services of private businesses, or take no action. Persons receiving WS's non-lethal technical and direct control assistance could still resort to lethal methods that were available to them.

3.1.4 Alternative 4: No Federal WS Mammal Damage Management

This alternative would eliminate WS involvement in MDM in Vermont. WS would not provide direct operational or technical assistance and requesters of WS's assistance would have to conduct their own MDM without WS input. Information on MDM methods would still be available to producers and property owners through other sources such as USDA Agricultural Extension Service offices, VTDFW, universities, or pest control organizations. Requests for information would be referred to VTDFW, local animal control agencies, or private businesses or organizations. Property owners and land managers could implement their own mammal damage management program, use contractual services of private businesses, use volunteer services, or take no action. This alternative would place the immediate burden of operational damage management work on the property owners and other federal, state, or county agencies.

3.2 MDM STRATEGIES AND METHODOLOGIES AVAILABLE TO WS IN VERMONT

The strategies and methodologies described below include those that could be used or recommended under Alternatives 1, 2 and 3 described above. Alternative 4 would terminate both WS technical assistance and operational MDM by WS. Appendix B is a more thorough description of the methods that could be used or recommended by WS.

3.2.1 Integrated Wildlife Damage Management

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. The philosophy behind IWDM is to implement the best combination of effective management methods in the most cost-effective² manner while minimizing the potentially harmful effects on humans, target and non-target species, and the environment. IWDM may incorporate cultural practices (e.g., animal husbandry), habitat modification (e.g., exclusion), animal behavior modification (e.g., scaring), removal of individual offending animals, local population reduction, or any combination of these, depending on the circumstances of the specific damage problem. WS considers the biology and behavior of the damaging species and other factors using the WS Decision Model (Slate et al 1992). The recommended strategy(ies) may include any combination of preventive and corrective actions that could be implemented by the requester, WS, or other agency personnel, as appropriate. Two strategies available are:

² The cost of management may sometimes be secondary because of overriding environmental, legal, human health and safety, animal welfare, or other concerns.

1. Preventive Damage Management is applying wildlife damage management strategies before damage occurs, based on historical problems and data. All non-lethal methodologies, whether applied by WS or resource owners, are employed to prevent damage from occurring and therefore fall under this heading. When requested, WS personnel provide information and conduct demonstrations, or take action to prevent additional losses from recurring. An example would be a cooperator installing and maintaining a water control structure to reduce potential flooding caused by beaver.

2. Corrective Damage Management Corrective damage management is applying wildlife damage management to stop or reduce current losses. As requested and appropriate, WS personnel provide information and conduct demonstrations, or take action to prevent additional losses from recurring. An example would be in areas where verified and documented livestock depredations are occurring, WS may provide information about fencing or husbandry techniques, or conduct operational damage management to stop the losses.

3.2.2 The IWDM Strategies Employed by WS

Technical Assistance Recommendations

“Technical assistance” as used herein is information, demonstrations, and advice on available and appropriate wildlife damage management methods and approaches. The implementation of damage management actions is the responsibility of the requester. In some cases, WS provides supplies or materials that are of limited availability for use by non-WS entities. Technical assistance may be provided through a personal or telephone consultation, or during an on-site visit with the requester. Generally, several management strategies are described to the requester for short and long-term solutions to damage problems; these strategies are based on the level of risk, need, and the practicality of their application. In some instances, wildlife-related information provided to the requestor by WS results in tolerance/acceptance of the situation. In other instances, management options are discussed and recommended.

Under APHIS NEPA implementing regulations and specific guidance for the WS program, WS technical assistance is categorically excluded from the need to prepare an EA or EIS. However, it is discussed in this EA because it is an important component of the IWDM approach to resolving mammal damage problems.

Direct Damage Management Assistance (Direct Control)

Direct damage management assistance includes damage management activities that are directly conducted or supervised by WS personnel. Direct damage management assistance may be initiated when the problem cannot effectively be resolved through technical assistance alone and when *Agreements for Control* or other comparable instruments are provided for direct damage management by WS. The initial investigation defines the nature, history, and extent of the problem; species responsible for the damage; and methods available to resolve the problem. The professional skills of WS personnel are often required to effectively resolve problems, especially if restricted use pesticides are necessary or if the problems are complex.

Educational Efforts

Education is an important element of WS program activities because wildlife damage management is about finding balance and coexistence between the needs of people and needs of wildlife. This is extremely challenging as nature has no balance, but rather, is in continual flux. In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage, lectures, courses, and demonstrations are provided to producers, homeowners, state and county agents, colleges and universities, and other interested groups. WS frequently cooperates with other agencies in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that WS personnel, other wildlife professionals, and the public are periodically updated on recent developments in damage management technology, programs, laws and regulations, and agency policies.

Research and Development

The National Wildlife Research Center (NWRC) functions as the research arm of WS by providing scientific information and development of methods for wildlife damage management that are effective and environmentally responsible. NWRC scientists work closely with wildlife managers, researchers, field specialists and others to develop and evaluate wildlife damage management techniques. NWRC scientists have authored hundreds of scientific publications and reports, and are respected world-wide for their expertise in wildlife damage management.

3.2.2.1 Examples of WS Direct Operational and Technical Assistance in MDM in Vermont

WS has been requested to assist with mammal damage and conflicts throughout Vermont. The following are examples of past and ongoing WS mammal damage management projects to provide a sample of the types of requests for assistance that WS receives in Vermont.

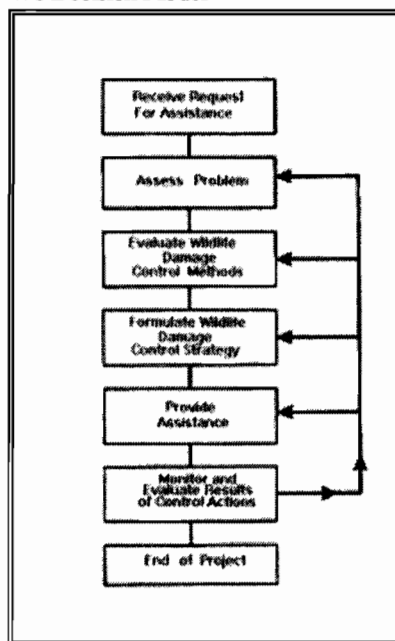
- To enhance the survival of a State listed species, the Vermont Fish & Wildlife entered into a Cooperative Service Agreement with WS to remove mammalian predators that were depredating the eggs/nests of State Threatened Eastern Spiny Soft Shell Turtles.
- To alleviate human health and safety threats to the flying public, the Newport State Airport entered into a Cooperative Service Agreement with WS to remove beavers to prevent flooding of property and to reduce the accumulation of standing water. The standing water was serving as a waterfowl attractant and therefore was a bird-aircraft strike threat to incoming and departing aircraft..
- To eliminate property damage, the Vermont State Buildings and Grounds Services entered into a Cooperative Service Agreement with WS to remove beavers from the Chittenden County Correctional Facility in 2004.
- To alleviate human health risks and property damage, the Vermont Department of Forests, Parks and Recreation entered into a Cooperative Service Agreement with WS to remove beavers from a Wildlife Management Area. Flooding caused by beavers was saturating septic systems on private properties adjacent to a wildlife management area.
- To reduce the negative impacts of beaver induced flooding, the Vermont Department of Fish and Wildlife worked cooperatively with WS to initiate a pilot program to install beaver baffles on private property throughout the state as a method of controlling flooding caused by beavers.
- A Washington County resident entered into a Cooperative Service Agreement with WS to remove beaver from a private pond in an effort to control flooding.
- A Lamoille County livestock producer entered into a Cooperative Service Agreement with WS to trap and remove coyotes in order to reduce sheep losses on his property.

3.2.3 WS Decision Making

WS personnel use a thought process for evaluating and responding to damage complaints which is depicted by the WS Decision Model and described by Slate et al. in 1992 (Figure 3-1). WS personnel are frequently contacted after requesters have tried or considered non-lethal methods and found them to be impractical, too costly, or inadequate for effectively reducing damage. WS personnel assess the problem then evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic and social considerations. Following this evaluation, methods deemed to be practical for the situation are incorporated into a management strategy. After this strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for further management is ended. In terms of the WS Decision Model (Slate et al. 1992), most damage management efforts consist of continuous feedback between receiving the request and

monitoring the results of the damage management strategy. The Decision Model is not a written documented process, but a mental problem-solving process common to most, if not all, professions.

Figure 3-1
WS Decision Model



3.2.4 Mammal Damage Management Methods Available for Use

USDA (1997, Appendix J) describes methods currently used by the WS program. Several of these were considered in this assessment because of their potential use in reducing mammal damage to agriculture, property, natural resources, and human/public health and safety. A listing and more detailed description of the methods used by Vermont WS for mammal damage management is found in Appendix B of this EA.

3.2.4.1 Nonchemical Methods

Agricultural producer and property owner practices consist primarily of nonlethal preventive methods such as **cultural methods**¹ and **habitat modification**.

Animal behavior modification refers to tactics that alter the behavior of mammals to reduce damages. Some but not all of these tactics include the following:

- Propane exploders
- Pyrotechnics
- Visual repellents and scaring tactics

Habitat modification is used whenever practical to attract or repel certain wildlife species. An example of habitat modification used in Vermont is the installation of water control devices and pond levelers to alleviate beaver damage and conflicts. These devices are installed to regulate the volume of water and can

¹Generally involves modifications to the management of protected resources to reduce their vulnerability to wildlife damage.

be effective in reducing flooding in certain situations. Water control devices and pond levelers also are utilized as a means of exclusion at road culverts.

Exclusion pertains to preventing access to resources through fencing or other barriers. Fencing of small critical areas can sometimes prevent animals which cannot climb from entering areas of protected resources. Fencing of culverts, drain pipes, and other water control structures can sometimes prevent beavers from building dams which plug these devices.

Live capture and relocation can be conducted to reduce damage caused by certain mammals. Various capture devices such as box or cage traps, and nets can be used to live capture mammals for relocation. In some instances permits are required by the State wildlife agency to capture and remove certain mammals.

Lure crops/alternate foods are crops planted or other food resources provided to mitigate the potential loss of higher value crops.

Sport hunting/trapping can be part of a MDM strategy to enhance the effectiveness of harassment techniques or used to reduce local populations of mammals. For example, WS sometimes directs trappers to contact VTDFW about areas where beaver are causing damage, or informs individuals requesting assistance about the option of utilizing sport trapping as a management tool.

Shooting is selective for the target species and may involve the use of spotlights and rifles or shotguns. Calls may also be utilized with shooting.

Foothold Traps can be effectively used to capture a variety of mammals. Placement of traps is contingent upon habits of the respective target species, habitat conditions, and presence of nontarget animals.

Snares are capture devices comprised of a cable formed in a loop with a locking device. Snares are usually placed in travel ways. Snares may be used as either a lethal or nonlethal method. Snares are generally easier to keep operational than foothold traps during inclement weather.

Cage traps are live capture traps used to trap a variety of small to medium sized mammals. Cage traps come in a variety of sizes and are made of galvanized wire mesh, and consist of a treadle in the middle of the cage that triggers the door to close behind the animal being trapped.

Body grip (Conibear type) traps are designed to cause the quick death of the animal that activates the trap. Body grip traps usually range in size from #110 to #330. Safety hazards and risks to humans are usually related to setting, placing, checking, or removing traps.

3.2.4.2 Chemical Methods

Explosives are defined as any chemical mixture or device which serves as a blasting agent or detonator. Explosives are generally used to breach beaver dams that are too large to remove by hand digging and typically after beaver have been removed from a damage situation.

Repellants. Several products are available that are designed to act as repellants for certain mammals. Most of these are taste repellants used on trees, shrubs, garbage, fences and other objects. As with most repellents, frequent reapplication is often necessary to obtain continued results.

Carbon dioxide (CO₂) gas is an American Veterinary Medical Association (AVMA) approved euthanasia method which is sometimes used to euthanize mammals which are live captured and when relocation is not a feasible option (Beaver et al. 2001). Live animals are placed in a container or chamber into which CO₂ gas is released. The animal quickly expires after inhaling the gas.

Gas cartridges are incendiary devices designed to give off carbon monoxide and other poisonous gases and smoke when ignited. They are used to fumigate mammal burrows.

Ketamine (Ketamine HCl) is a dissociative anesthetic that is used to capture wildlife, primarily mammals, birds, and reptiles. It is used to eliminate pain, calm fear, and allay anxiety.

Telazol (tiletamine) is another anesthetic used in wildlife capture. It is 2.5 to 5 times more potent than ketamine; therefore, it generally works faster and lasts longer.

Xylazine is a sedative that calms nervousness, irritability, and excitement, usually by depressing the central nervous system. Xylazine is commonly used with ketamine to produce a relaxed anesthesia.

Sodium Pentobarbital is a barbiturate that rapidly depresses the central nervous system to the point of respiratory arrest. There are DEA restrictions on who can possess and administer this drug. Some states may have additional requirements for personnel training and particular sodium pentobarbital products available for use in wildlife. Certified WS personnel are authorized to use sodium pentobarbital and dilutions for euthanasia in accordance with DEA and state regulations.

3.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

Several alternatives were considered, but not analyzed in detail. These were:

3.3.1 Lethal Mammal Damage Management Only By WS

Under this alternative, WS would not conduct any nonlethal control of mammals for MDM purposes in the State, but would only conduct lethal MDM. This alternative was eliminated from further analysis because some mammal damage problems can be resolved effectively through nonlethal means. For example, a number of damage problems involving the encroachment of smaller mammals such as raccoons into buildings can be resolved by installing barriers or repairing of structural damage to the buildings, thus excluding the animal. Further, such damage situations as immediately shooting a fox on a runway might not be possible, where as scaring them away through noise harassment might resolve the air passengers' threat at once.

3.3.2 Compensation for Mammal Damage Losses

The compensation alternative would require the establishment of a system to reimburse persons impacted by mammal damage. This alternative was eliminated from further analysis because no federal or state laws currently exist to authorize such action. Under such an alternative, WS would not provide any direct control or technical assistance. Aside from lack of legal authority, analysis of this alternative in the ADC Final EIS indicated that the concept has many drawbacks (USDA 1997):

- It would require larger expenditures of money and labor to investigate and validate all damage claims to determine and administer appropriate compensation.
- Compensation would most likely be less than full market value.
- Responding in a timely fashion to all requests to assess and confirm damage would be difficult and certain types of damage could not be conclusively verified. For example, proving conclusively in individual situations that mammals were responsible for disease outbreaks would be impossible, even though they may actually have been responsible. Thus, a compensation program that requires verification would not meet its objective for mitigating such losses.
- Compensation would give little incentive to resource owners to limit damage through improved cultural, husbandry, or other practices and management strategies.
- Not all resource owners would rely completely on a compensation program and unregulated lethal control would most likely continue as permitted by state law.
- Compensation would not be practical for reducing threats to human health and safety.

3.3.3 Short Term Eradication and Long Term Population Suppression

An eradication alternative would direct all WS program efforts toward total long term elimination of mammal populations on private, State, Local and Federal government land wherever a cooperative program was initiated in the State. In Vermont, eradication of native mammal species is not a desired population management goal of State agencies or WS. Eradication as a general strategy for managing mammal damage will not be considered in detail because:

- All State and Federal agencies with interest in, or jurisdiction over, wildlife oppose eradication of any native wildlife species.
- Eradication is not acceptable to most people.

Suppression would direct WS program efforts toward managed reduction of certain problem populations or groups. In areas where damage can be attributed to localized populations of mammals, WS can decide to implement local population suppression as a result of using the WS Decision Model.

It is not realistic or practical to consider large-scale population suppression as the basis of the WS program. Typically, WS activities in the State would be conducted on a very small portion of the sites or areas inhabited or frequented by problem species.

3.3.4 Nonlethal Methods Implemented Before Lethal Methods

This alternative is similar to Alternative 2 except that WS personnel would be required to always recommend or use nonlethal methods prior to recommending or using lethal methods to reduce mammal damage. Both technical assistance and direct damage management would be provided in the context of a modified IWDM approach. Alternative 2, the Proposed Action, recognizes nonlethal methods as an important dimension of IWDM, gives them first consideration in the formulation of each management strategy, and recommends or uses them when practical before recommending or using lethal methods. However, the important distinction between the Nonlethal Methods First Alternative and the Proposed Alternative is that the former alternative would require that all nonlethal methods be used before any lethal methods are recommended or used.

While the humaneness of the nonlethal management methods under this alternative would be comparable to the Proposed Program Alternative, the extra harassment caused by the required use of methods that may be ineffective could be considered less humane. As local mammal populations increase, the number of areas negatively affected by mammals would likely increase and greater numbers of mammals would be expected to congregate at sites where nonlethal management efforts were not effective. This may ultimately result in a greater numbers of mammals being killed to reduce damage than if lethal management were immediately implemented at problem locations. Once lethal measures were implemented, mammal damage would be expected to drop relative to the reduction in localized populations of animals causing damage.

Since in many situations this alternative would result in greater numbers of animals being killed to reduce damage, at a greater cost to the requester, and result in a delay of reducing damage in comparison to the Proposed Alternative, the Nonlethal Methods Implemented Before Lethal Methods Alternative is removed from further discussion in this document.

3.3.5 Bounties

Payment of funds (bounties) for killing some mammals suspected of causing economic losses have not been supported by Vermont Department of Fish and Wildlife as well as most wildlife professionals for many years (Latham 1960, Hoagland 1993). WS concurs with these agencies and wildlife professionals because of several inherent drawbacks and inadequacies in the payment of bounties, including:

- Bounties are generally ineffective at controlling damage, especially over a wide area such as Vermont,
- Circumstances surrounding the take of animals are typically arbitrary and completely unregulated,
- It is difficult or impossible to assure animals claimed for bounty were not taken from outside the damage management area, and
- WS does not have the authority to establish a bounty program.

3.4 STANDARD OPERATING PROCEDURES FOR MAMMAL DAMAGE MANAGEMENT TECHNIQUES

3.4.1 Standard Operating Procedures

The current WS program, nationwide and in Vermont, uses SOPs and these are discussed in detail in Chapter 5 of the ADC Final EIS (USDA 1997). Some key SOPs pertinent to the proposed action and alternatives of this EA include:

- The WS Decision Model thought process which is used to identify effective wildlife damage management strategies and their effects.
- Reasonable and prudent measures or alternatives are identified through consultation with the USFWS and are implemented to avoid effects to T&E species.
- EPA-approved label directions are followed for all pesticide use. The registration process for chemical pesticides is intended to assure minimal adverse effects to the environment when chemicals are used in accordance with label directions.
- Drugs are used according to the Drug Enforcement Agency, FDA, and WS program policies and directives and procedures are followed that minimizes pain.
- All controlled substances are registered with DEA or FDA.
- WS employees would follow approved procedures outlined WS Field Manual for the Operational Use of Immobilizing and Euthanizing Drugs (Johnson, et al. 2001).
- WS employees that use controlled substances are trained to use each material and are certified to use controlled substances under Agency certification program.
- WS employees who use pesticides and controlled substances participate in State approved continuing education to keep abreast of developments and maintain their certifications.
- Pesticide and controlled substance use, storage, and disposal conform to label instruction and other applicable laws and regulations, and Executive Order 12898.
- Material Safety Data Sheets for pesticides and controlled substances are provided to all WS personnel involved with specific WDM activities.
- All WS Specialists in the State who use restricted chemicals are trained and certified by, or else operate under the direct supervision of, program personnel or others who are experts in the safe and effective use of chemical MDM materials.
- Research is being conducted to improve MDM methods and strategies so as to increase selectivity for target species, to develop effective nonlethal control methods, and to evaluate nontarget hazards and environmental effects.
- Management actions would be directed toward localized populations or groups of target species and/or individual offending members of those species. Generalized population suppression across the State, or even across major portions of the State, would not be conducted.
- WS uses MDM devices and conducts activities for which the risk of hazards to public safety and hazard to the environment have been determined to be low according to a formal risk assessment (USDA 1997, Appendix P). Where such activities are conducted on private lands or other lands of restricted public access, the risk of hazards to the public is even further reduced.

3.4.2 Additional SOPs Specific to the Issues

The following is a summary of additional SOPs that are specific to the issues listed in Chapter 2 of this document.

Effects on Target Species Populations

- MDM activities are directed to resolving mammal damage problems by taking action against individual problem mammals, or local populations or groups, not by attempting to eradicate populations in the entire area or region.
- WS take is monitored by comparing numbers of mammals killed by species or species group (e.g., carnivore) with overall populations or trends in populations to assure the magnitude of take is maintained below the level that would cause significant adverse effects to the viability of native species populations.

Effects on Nontarget Species Populations Including T&E Species

- WS personnel are trained and experienced to select the most appropriate method for taking problem animals and excluding nontargets. For example, WS personnel utilize pan tension devices or alter trap triggers in order to exclude or reduce the capture of non-target species.
- WS has consulted with the USFWS regarding potential effects of control methods on T&E species, and abides by reasonable and prudent alternatives (RPAs) and/or reasonable and prudent measures (RPMs) established as a result of that consultation. For the full context of the Biological Opinion see the ADC FEIS, Appendix F (USDA 1997). Further consultation on species not covered by or included in that formal consultation process will be initiated with the USFWS and WS will abide by any RPAs, RPMs, and terms and conditions that result from that process to avoid jeopardizing any listed species.
- WS uses chemical methods for MDM that have undergone rigorous research to prove their safety and lack of serious effects on nontarget animals and the environment.

Effects on Human Health and Safety

- WS personnel are trained and supervised in the use of MDM methods, including firearms, watercraft, explosives, traps, immobilization drugs, and vertebrate pesticides to ensure that they are used properly and according to policy. Furthermore, WS personnel using restricted-use vertebrate pesticides will be certified according to EPA and Vermont State laws. WS personnel using binary explosives in MDM will be certified to use them according to WS policy and directives, and WS specialists using firearms will routinely receive firearms safety training according to WS policy.

Effects on Aesthetics

- Whenever practicable, WS personnel perform components of mammal removal activities, such as shooting and euthanizing, away from public view.
- In addition, animals which are transported after being killed are concealed from public view when they must be transported in areas of human habitation, in an effort to reduce adverse effects on the aesthetic quality of the environment.

Humaneness of Methods Used by Wildlife Services

- When lethal methods are determined necessary, WS personnel kill target animals as quickly and humanely as possible. In most field situations, mammals (raccoons and skunks) were euthanized with Potassium Chloride after being anesthetized, occasionally, a shot to the brain with a small caliber firearm is performed which causes rapid unconsciousness followed by cessation of heart function and respiration. Both methods are in concert with the American Veterinary Medical Association's definition of euthanasia (Beaver et al. 2001).

- Research continues with the goal of improving the selectivity and humaneness of management devices.
- WS personnel recommend the use of various nonlethal methods such as exclusion, habitat and animal behavior modification, where these are applicable.
- WS personnel use trap lures and set traps in locations that are conducive to capturing the target animal, but minimize potential effect on nontarget species. Further, all damage management methods would be used in a manner that minimizes pain and suffering of individual animals, to the extent that the method is effective and its use is practical.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

4.0 INTRODUCTION

Chapter 4 provides information needed for making informed decisions in selecting the appropriate alternative for meeting the purpose of the proposed action. This chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 2. This section analyzes the environmental consequences of each alternative in comparison with the no action alternative to determine if the real or potential effects would be greater, lesser, or the same.

The following resource values within the State are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. These resources will not be analyzed further.

Cumulative Effects: Cumulative effects are discussed in relationship to each of the alternatives analyzed, with emphasis on potential cumulative effects from methods employed, and including summary analyses of potential cumulative impacts to target and non-target species, including T&E species.

Irreversible and Irretrievable Commitments of Resources: Other than minor uses of fuels for motor vehicles and other materials, there are no irreversible or irretrievable commitments of resources.

Effects on sites or resources protected under the National Historic Preservation Act: WS MDM actions are not undertakings that could adversely affect historic resources (See Section 1.1.9).

4.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

Six key potential impacts of this program have been identified, and each of these impacts is discussed for each alternative. The six impacts include: effects on target mammal species; effects on other wildlife species, including T&E species; effects on human health and safety; impacts to stakeholders, including aesthetics; humaneness and animal welfare concerns of methods used; and effects on wetlands.

As described in section 2.1, in those situations where a non-federal cooperator has obtained the appropriate VTFW permit or authority, and has already made the decision to remove or otherwise manage a specific mammal species to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, however, certain aspects of the human environment may actually benefit more from WS's involvement than from a decision not to assist. For example, if a cooperator believes WS has greater expertise to selectively remove a target species than a non-WS entity; WS management activities may have less of an impact on target and non-target species than if the non-federal entity conducted the action alone. Thus, in those situations, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

4.1.1 Effects on Target Mammal Species Populations

4.1.1.1 Alternative 1: Technical Assistance Only

Under this alternative, WS would have no impact on target mammal populations in the State because the program would not provide any operational MDM activities. The program would be limited to providing advice only. Some resource owners experiencing damage may trap or shoot mammals, or hire private trappers. Some mammal populations would continue to increase where trapping and shooting pressure was low and may decline or stabilize where trapping and shooting pressure was adequate.

Since affected resource owners would likely lethally remove the damaging mammal that would no longer be removed by WS, private efforts to reduce or prevent mammal damage and perceived disease transmission risks could increase, which could result in similar or even greater effects on those populations than the Proposed Action. However, for the same reasons shown below in the population effects analysis in section 4.1.1.2, it is unlikely that target mammal populations would be adversely impacted by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of other chemicals which could lead to real but unknown effects on target mammal populations (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003).

4.1.1.2 Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

In those situations where a non-federal cooperator has obtained the appropriate VTFW permit or authority, and has already made the decision to remove or otherwise manage a specific mammal species to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*.

Analysis of this issue is limited to those species killed during WS MDM. The analysis for magnitude of impact generally follows the process described in Chapter 4 of USDA (1997). Magnitude is described in USDA (1997) as "... a measure of the number of animals killed in relation to their abundance." Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable harvest levels, and actual harvest data. Qualitative determinations are based on population trends and harvest data when available. Generally, WS only conducts damage management on species whose population densities are high and usually only after they have caused damage. Table 4-1 identifies the number of mammals killed by WS during FY2000-FY2005.

Table 4-1. Mammals lethally removed by WS for Mammal Damage Management during FY 2000 through FY 2005 in Vermont.

Species	Cage Trap	Snap Trap	Conibear trap	Leg-hold	Gas cartridge	Shot	Total
Beaver	0	0	8	0	0	0	8
Coyotes	0	0	0	1	0	0	1
Mink	0	0	0	1	0	0	1
Raccoons	169	0	0	0	0	1	170
Skunks, striped	15	0	0	0	0	2	17
Woodchucks	0	0	0	0	35	0	35
Red Fox	3	0	0	14	0	0	17

Beaver Population Information and Effects Analysis

Beavers are large, bulky rodents whose most prominent features include a large scaly, paddle shaped tail and orange/white colored incisors (Hill 1982). Most adults weigh from 15.8 - 38.3 kg (35-50 lbs) with some occasionally reaching more than 45 kg (100 lbs). Beavers are the largest rodent in North America (Miller and Yarrow 1994) and range in most of Canada and the United States, with the exception of portions of Florida and the desert southwest. Beaver are active throughout most of the year and are primarily nocturnal, but it is not uncommon to see them during the daylight hours. Beavers living along a river or large stream generally make bank burrows with multiple underwater entrances. Those in quiet streams, lakes, and ponds usually build dams and a lodge (National Audubon Society 2000). Sign of beaver in an area include

gnawing around the bases of trees and trees which have fallen as a result of this gnawing. Tree parts are stripped of bark, which is a primary beaver food.

Beavers were trapped extensively during the 19th and part of the 20th century, and as a result, disappeared from much of their range (Novak 1987). Now re-established over most of the continent, and protected from overexploitation, the beaver has become a pest in some regions. Dams built and maintained by beaver may flood stands of commercial timber, highways, and croplands. However, the dams also help reduce erosion, and the ponds formed by the dams may create a favorable habitat for many forms of life (Hill 1982).

Beavers occur mostly in family groups that are comprised of 2 adult parents with 2-6 offspring from the current or previous breeding season. Average family group size has been documented as ranging from 3.0 to 9.2 (Novak 1987). Beaver abundance has been reported in terms of families per kilometer of stream or per square kilometer of habitat. Novak (1987) summarized reported beaver family abundance as ranging from 0.31 to 1.5 families per kilometer of stream, which converts to 0.5 - 2.4 families per mile of stream. Densities in terms of families per square kilometer have been reported to range from 0.15 to 3.9 (Novak 1987), which is the same as 0.24 to 6.3 per square mile.

Beaver are present in all 14 Vermont counties, and their population is considered increasing across the State (K. Royar, pers. comm., 2006). No population estimates were available for beavers in Vermont. Therefore the best available information was used to estimate statewide populations. There are over 220,000 acres of wetlands in Vermont (VTDEC 1999) including an estimated minimum of 5,261 miles of streams (MacArdle, J.J. 1996). Using the conservative estimate of 3 beavers per family group and an abundance of 0.5 families per stream mile provided by Novak (1987), the minimum statewide beaver population estimate for Vermont could be estimated at 7,900 beavers.

Beavers are a protected furbearer in Vermont with no limit on the number that may be harvested. Harvest seasons for take are set by the VTFW. The VTFW also has established Best Management Practices (BMP) for dealing with human and beaver conflicts. From 2000-2004, 7354 beavers were harvested in Vermont according to the Vermont Trapper Mail Survey (K. Royar, pers. comm., 2006).

During FY1998-2005 WS responded to 598 (average = 75/yr) requests for assistance with beaver damage. Beaver damage included natural areas, as well as commercial forestry, pastures, and landscaping. Damage was primarily a result of beaver induced flooding or feeding activity (USDA-WS MIS Database 2005).

During FY 2000-2005 WS killed 8 beavers in Vermont during all damage management projects (USDA-WS MIS Database 2005). However, requests for assistance related to beaver damage continue to rise in Vermont. Complaints last year ranged from flooding of property and roads to tree damage. Some recent examples include: In 2003, Vermont Route 111 road washout in Morgan which cost \$105,280.81 in repairs; road flooding at West Mountain Wildlife Management Area requiring water level control devices (beaver baffles) to be installed for flood control; and property flooding in Swanton where multiple control methods were utilized to alleviate damage. During 2003, the Vermont Agency of Transportation reported spending approximately \$180-190 thousand on beaver damage, including the above described washout. In 2004, beaver activity at the Newport State Airport resulted in flooding that served as an attractant to birds and mammals creating the potential for aircraft/wildlife strikes. In 2004, a private landowner experienced several hundred dollars in damage as a result of beaver girdling trees on their property. During 2005, 1 beaver was killed during all MDM activities conducted by WS in Vermont. Beaver populations either increased or remained stable in the state during that same period (K.Royar, pers. comm., 2006).

In future programs, WS may be requested to address damage being caused by beavers anywhere in Vermont to protect resources or human health and safety. Beaver damage management activities would target single animals or local populations of the species at sites where their presence was causing unacceptable damage to agriculture, human health or safety, natural resources, or property. Some local populations may be temporarily reduced as a result of MDM projects aimed at reducing damage at a local site. WS beaver management activities are coordinated with the appropriate VTFW personnel and efforts made to insure compliance with VTFW established BMP for mitigating human and beaver conflicts. Based upon current and an anticipated increase in requests for beaver damage management assistance in the future, it is unlikely that WS would kill more than 200 beavers per year in all MDM activities in Vermont.

Based upon the above information, WS limited lethal take of beavers would have no adverse impacts on overall beaver populations in the state. The VTFW has determined that there is no evidence to suggest that human mediated mortality resulting from regulated harvest and damage management, including removal by WS, will be detrimental to the survival of the beaver population in the state of Vermont (K. Royar , pers. Comm., 2006).

Red Fox Population Information and Effects Analysis

The red fox is a typically proportioned member of the dog family. The bushy and unusually long tail, pointed ears, slender muzzle, and slanted eyes coupled with its small dog size and typical reddish coloration, make the red fox instantly recognizable to most people. This species is also the most common and well-know species in the genus *Vulpes*, which includes about 10 other species worldwide (Honacki et al. 1982). Typically, black-tipped ears, black cheek patches, white throat parts, a lighter underside, and black “leg stockings” are found on most red foxes. The white tip of the tail (which is much more prominent in North American foxes than elsewhere) can be used to distinguish brownish fox pups from similarly colored coyote pups, which lack a white tail tip (Voigt 1987).

In North America the red fox weighs about 3.5 - 7 kg.(7.7 - 15.4 lbs.), with males averaging about 1 kg. (2.2 lbs) heavier than females. Generally, adult foxes measure 100 - 110 cm (39 - 43 inches) from the tip of the nose to the tip of the tail. Juveniles in their first autumn are as large as adults (Voigt 1987). They occur over most of North America, north and east from southern California, Arizona, and central Texas. They are found throughout most of the U. S. with the exception of a few isolated areas. Prehistoric fossil records suggest that the red fox may not have inhabited much of the U. S., but were plentiful in many parts of Canada. However, it has been suggested that climatic factors, interbreeding with the introduced European red fox, extirpation of the gray and red wolf, and clearing of land for agriculture has possibly contributed to the present-day expansion and range of this species in North America (Voigt 1987).

Red foxes are adaptable to most habitats within their range, but usually prefer open country with moderate cover. Some of the highest fox densities reported are in the north-central U. S., where woodlands are interspersed with farmlands. The range of the species has expanded in recent years to fill habitats formerly occupied by coyotes. The reduction of coyotes in many sagebrush/grassland areas of Montana and Wyoming has resulted in increased fox numbers. Red foxes have also demonstrated their adaptability by establishing breeding populations in many urban areas of the U. S., Canada, and Europe (Phillips and Schmidt 1994). In many areas, competition with other canids and the availability of suitable year-round food resources limit fox survival. Habitat determines the availability of year-round food resources and the presence or absence of other canids. Because these 2 factors strongly influence red fox survival, habitat limits fox numbers but seldom limits distribution (Voigt 1987).

Red foxes mate from January - March and produce litters of 1-10 kits after a gestation period of 51-53 days. They rear young in a maternity den, commonly an enlarged groundhog or badger den, usually in sparse ground cover on a slight rise, with a good view of all approaches (National

Audubon Society 2000). Juvenile foxes are able to breed before their first birthday, but in areas of high red fox densities, most yearlings do not produce pups (Harris 1979, Voigt and MacDonald 1984, Voigt 1987). Gier (1968) reported average litter sizes of 4.8-5.1 in years with low rodent numbers, but litters of 5.8-6.2 during years with high rodent numbers. Litter sizes of 1-19 pups have been reported (National Audubon Society 2000). These offspring disperse from the denning area during the fall and establish breeding areas in vacant territories, sometimes dispersing considerable distances. Red foxes are generally solitary animals as adults, except when mating (Phillips and Schmidt 1994). Rabies and distemper are associated with this species.

The density of red fox populations is difficult to determine because of the animals secretive and elusive nature. Estimates are prone to error even in open prairie areas with good visibility. Methods used to estimate numbers have included aerial surveys, questionnaires to rural residents and mail carriers, scent post surveys, intensive ground searches, and indices derived from hunting and trapping harvest (Voigt 1987). In Great Britain, where food is superabundant in many urban areas, densities as high as 30 foxes / km² (78 / mi²) have been reported (Harris 1977, MacDonald and Newdick 1982, Harris and Rayner 1986), while in southern Ontario, densities of about 1 fox km² (2.6 / mi²) occur during spring. This includes both pups and adults. In small areas of the best habitat, 3 times as many foxes have been observed (Voigt 1987). However, these densities rarely occur extensively because of the dispersion of unsuitable habitat, high mortality, or the presence of competition such as coyotes (Voigt and Earle 1983). Cyclical changes in fox numbers occur routinely and complicate density estimates as well as management. These cycles can occur because of changes in prey availability, or disease outbreaks, especially rabies, among red foxes. For fox populations to remain relatively stable, mortality and reproduction must balance approximately.

Home ranges for red foxes in the eastern U. S. are usually from 500 - 2,000 ha. (1,235 - 4,940 acres) in rural settings such as farmland (Voigt and Tinline 1980), but such sizes may not apply among fox populations in urban settings.

The red fox is a skilled nonspecific predator, foraging on a variety of prey. It is also an efficient scavenger, and in parts of the world garbage and carrion are extremely important to its diet (Voigt 1987). They are opportunists, feeding mostly on rabbits, mice, bird eggs, insects, and native fruit. They usually kill animals smaller than a rabbit, although fawns, pigs, kids, lambs, and poultry are sometimes taken (Phillips and Schmidt 1994). They also feed on squirrels, groundhogs, crayfish, and even grasses (National Audubon Society 2000).

Red fox populations in Vermont appear to be stable to slightly increasing over the past 5 years (K. Royar, pers. comm., 2006). No population estimates were available for red foxes in Vermont. Therefore the best available information was used to estimate statewide populations. There are over 5 million acres of rural land in Vermont, with approximately 600,000 acres considered cropland (U.S. Census Bureau 1999). Using the assumption that 50% of the rural lands throughout the state have sufficient habitat to support red fox, foxes are only found in rural habitat, red fox home ranges average 1,235 – 4,940/acre, and home ranges of foxes do not overlap, a conservative statewide red fox population could be estimated at over 1,000 foxes.

Red fox are a protected furbearer in Vermont with no limit on the number that may be harvested. Harvest seasons for take are set by VTFW. From 2000-2004, 1226 red fox were harvested in Vermont according to the Vermont Trapper Mail Survey (K. Royar, pers. comm., 2006).

WS provided technical advice for 2248 requests (average = 281/yr) for assistance with red fox damage in Vermont during FY 1998-2005. Red fox damage reported to WS included threats to human health or safety and damage to pets and landscaping.

Wildlife Services personnel killed 17 red foxes during all MDM programs in Vermont during FY 1998-2005 (USDA-WS MIS Database 2005). In future programs, WS may be requested to

address damage being caused by red foxes anywhere in Vermont to protect resources or human health and safety. Red fox damage management activities would target single animals or local populations of the species at sites where their presence was causing unacceptable damage to agriculture, human health or safety, natural resources, or property. Some local populations may be temporarily reduced as a result of MDM projects aimed at reducing damage at a local site. Based upon current and an anticipated increase in requests for red fox damage management assistance in the future, it is unlikely that WS would kill more than 200 red foxes each year while conducting MDM activities throughout Vermont.

Based upon the above information, WS limited lethal take of red foxes would have no adverse impacts on overall red fox populations in Vermont. The VTFW has determined that there is no evidence to suggest that human mediated mortality resulting from regulated harvest and damage management, including removal by WS, will be detrimental to the survival of the red fox populations in the state of Vermont (K. Royar, pers. comm., 2006).

Raccoon Population Information and Effects Analysis

The raccoon is a stocky mammal about 61-91 cm (2-3 feet) long, weighing 4.5 - 13.5 kg (10 - 30 lbs). It is distinctly marked, with a prominent black mask over the eyes and a heavily furred, ringed tail. The animal is a grizzled salt-and-pepper gray and black above, although some individuals are strongly washed with yellow (Bogges 1994b).

The raccoon is one of the most omnivorous of animals. It will eat carrion, garbage, birds, mammals, insects, crayfish, mussels, other invertebrates, and a wide variety of grains, various fruits, other plant materials and most or all foods prepared for human or animal consumption (Sanderson 1987). They occasionally kill poultry (Bogges 1994b), and come into conflict with man frequently in urban and suburban environments by raiding garbage cans and pet food sources (Scott R. Stopak, WS, pers. comm., 2003).

The raccoon is found throughout most of the United States, with the exception of the higher elevations of mountainous regions and some areas of the arid southwest (Bogges 1994b, National Audubon Society 2000). Raccoons are more common in the wooded eastern portions of the United States than in the more arid western plains (Bogges 1994b), and are frequently found in cities or suburbs as well as rural areas (National Audubon Society 2000). Movements and home ranges of raccoons vary according to sex, age, habitat, food sources, season, and other factors. In general males have larger home ranges than females. Home range diameters of raccoons have been reported as being 1-3 km (0.6 - 2.9 mi.) maximum, with some home range diameters of dense suburban populations to be 0.3-0.7 km (0.2 - 0.4 mi.).

Absolute raccoon population densities are difficult or impossible to determine because of the difficulty in knowing what percentage of the population has been counted or estimated and the additional difficulty of knowing how large an area the raccoons are using (Sanderson 1987). Due to their adaptability raccoon densities reach higher levels in urban areas than that of rural areas. Relative raccoon population densities have been variously inferred by take of animals per unit area. For instance, Twichell and Dill (1949) reported removing 100 raccoons from tree dens in a 41 ha (101 acres) waterfowl refuge area, while Yeager and Rennels (1943) studied raccoons on 881 ha (2,177 acres) in Illinois and reported trapping 35-40 raccoons in 1939-39, 170 in 1939-40, and 60 in 1940-41. Slate (1980) estimated 1 raccoon/7.8 ha (19.3 acres) in New Jersey in predominantly agricultural land on the inner coastal plain. Raccoon densities of 100 per sq. mile (1 raccoon per 6.4 acres) can be attained around abundant food sources (Kern 2002). Kennedy et al. (1991) estimated 13 raccoons per 100 ha (1 raccoon per 19 acres) of lowland forest in Tennessee. Density studies conducted by WS for 3 consecutive years (2001-2003) in Highgate, Vermont; Franklin County ranged from 7.1 to 9 raccoons per kilometer squared in non-mountainous agricultural habitat (Cooperative Rabies Management Program National Report, 2003). A WS raccoon density study conducted in 1997 in St. Albans City, Franklin County,

Vermont showed the density to be 10 raccoons per kilometer squared. In 1997 a WS raccoon density study conducted on Jay Peak, Vermont (elevation 730 meters) showed a density of 2.5 raccoons per kilometer squared (K. Nelson, pers. comm., 2006).

Raccoon population trends in Vermont appear to be stable to slightly increasing since 2000 (K. Royar, pers. comm., 2006). No statewide population estimates were available for raccoons in Vermont at the time of this publication. Therefore the best available information was used to estimate statewide populations. There are over 5 million acres of rural land in Vermont, with approximately 600,000 acres considered cropland (U.S. Census Bureau 1999). Using the assumption that 75% of the rural lands throughout the state have sufficient habitat to support raccoons, raccoons are only found in rural habitat, and raccoon densities average 9 raccoon per square kilometer, a conservative statewide raccoon population could be estimated at over 137,000 raccoons.

In Vermont, raccoons cause damage to gardens, residential and non-residential buildings, domestic fowl, and pets, as well as general property damage. Results of their feeding may be the total loss of ripened sweet corn in a garden. Damage to buildings generally occurs when they seek to gain entry or begin denning in those structures. Raccoons may den in uncapped chimneys, or may tear off shingles or fascia boards to gain access to attics or wall spaces. They may also damage or destroy sod by rolling it up in search of earthworms and other invertebrates (Bogges 1994b).

Citizens of Vermont are also concerned about health and safety issues associated with raccoons. These diseases include, but are not limited to, canine distemper and rabies, and the roundworm *Baylisascaris procyonis*, the eggs of which survive for extremely long periods in raccoon feces and soil contaminated by them. Ingestion of these eggs can result in serious or fatal infections in other animals as well as humans (Davidson and Nettles 1997).

Raccoons are protected furbearers in Vermont with no limit on the number that may be harvested. Harvest seasons for take are set by VTFW. Total harvest data was unavailable, however, according to the Vermont Trapper Mail Survey; 1896 raccoons were harvested between 2000 and 2004 (K. Royar, pers. comm., 2006)

Wildlife Services provided technical assistance for 4120 requests from individuals with raccoon damage in Vermont during FY 1998-2005. Complainants reported \$200 in damages resulting from raccoons during the period. Loss values were not obtained for all reports. Fifty-seven percent of individuals contacted WS with regard to human health and safety issues (USDA-WS MIS Database 2005). Complainants are rarely able to provide loss values for human health and safety threats.

Wildlife Services conducts efforts to combat the spread of raccoon rabies in Vermont. These activities are part of the national rabies barrier program covered under separate environmental analyses (USDA 2001). The number of raccoons lethally removed as part of the Vermont raccoon rabies program is included in this analysis to analyze the cumulative take of raccoons for all WS activities in the State. Wildlife Services killed 170 raccoons (average = 28.3/ yr) in all MDM programs in Vermont during FY 2000-2005 (USDA-WS MIS Database 2005; and USDA APHIS – WS annual tables). This number constitutes only a very small percentage of the estimated total population of this species in the state.

In future programs, WS may be requested to address damage being caused by raccoons anywhere in Vermont to protect resources or human health and safety. Raccoon damage management activities would target single animals or local populations of the species at sites where their presence was causing unacceptable damage to agriculture, human health or safety, natural resources, or property. Some local populations may be temporarily reduced as a result of MDM projects aimed at reducing damage at a local site. Based upon an anticipated increase for requests

for WS assistance, it is unlikely that WS would kill more than 1,000 raccoons each year in MDM activities throughout Vermont.

Based upon the above information, WS limited lethal take of raccoon would have no adverse impacts on overall raccoon populations in Vermont. The VTFW has determined that there is no evidence to suggest that human mediated mortality resulting from regulated harvest and damage management, including removal by WS, will be detrimental to the survival of the raccoon populations in the state of Vermont (K. Royar, pers. comm., 2006).

Striped Skunk Population Information and Effects Analysis

Although easily recognized by their black and white fur, the striped skunk may be most readily recognized by the odiferous smell of its' musk. They are common throughout the United States and Canada (Rosette 1987). Striped skunks are primarily nocturnal and do not have a true hibernation period, although during extremely cold weather it may become temporarily dormant. The striped skunk is an omnivore, feeding heavily on insects such as grasshoppers and crickets, beetles and bees and wasps (Godin 1982). The striped skunk's diet also includes small mammals, the eggs of ground-nesting birds and amphibians. Striped Skunks are typically non-aggressive, and will attempt to flee when approached by humans (Rosatte 1987). However, when provoked, skunks will give a warning and assume a defensive posture prior to discharging their foul-smelling musk. This musk is sulfur-alcohol compounds known as butylmercaptan (Godin 1982).

The striped skunk may use abandoned burrows of other animals as a home. They may also dig their own burrow, or use a protected place, such as a hollow log, crevice, or the space beneath a building. This species is currently the chief carrier of rabies in the United States (National Audubon Society 2000).

Adult skunks begin breeding in late February. Yearling females (born in the preceding year) mate in late March. Gestation usually lasts about 7-10 weeks, and there is usually only 1 litter annually. Litters commonly consist of 4-6 young. The home range of striped skunks is usually not consistent. It appears to be in relation to life history requirements such as winter denning, feeding activities, dispersal and parturition (Rosatte 1987). Other literature reported the home ranges of striped skunks to average between 2.2 and 4.9 km² (0.85 -1.9 miles²) in rural areas of Minnesota and Illinois (Rosette, in Novak, et al. 1987). During the breeding season, males may travel larger areas in search of females. Skunk densities vary widely according to season, food sources and geographic area. Densities have been reported to range from 1 skunk per 77/acres to 1 per 10/acres (Rosatte 1987).

Skunk populations in Vermont appear to be stable (K. Royar, pers. comm., 2006). No population estimates were available for striped skunks in Vermont at the time of this publication. Therefore the best available information was used to estimate statewide populations. There are over 5 million acres of rural land in Vermont, with approximately 600,000 acres considered cropland (U.S. Census Bureau 1999). Using the assumption that 50% of the rural lands throughout the state have sufficient habitat to support striped skunks, skunks are only found in rural habitat, and skunk densities average 1 skunk per 77/acre, a conservative statewide striped skunk population could be estimated at over 32,500 skunks.

In Vermont, the VTFW has established year round harvest season on striped skunks with no bag or possession limits. Total harvest data was unavailable, however, according to the Vermont Trapper Mail Survey; 540 skunks were harvested between 2000 and 2004 (K. Royar, pers. comm., 2006).

Wildlife Services responded to 2735 requests (average = 342/yr) for assistance with striped skunk damage during FY 1998-2005. Resources affected included human health and safety, general property, residential and non-residential buildings, livestock, pets, and landscaping. Damage also

included burrowing/digging, odor, nuisance, rabies threats, and other threats (USDA - MIS Database 2005). Most complaints were handled by providing technical assistance advice on methods for addressing damage. Complainants reported \$1250 in damages resulting from striped skunks during the period. Damage related to human health and safety was commonly reported (27%)(USDA - MIS Database 2005). Loss values were not obtained for all reports, especially human health and safety. Complainants are rarely able to provide loss values for human health and safety threats.

Wildlife Services killed 17 striped skunks (average = 2.1/yr) in all MDM programs in Vermont during FY 1998-2005 (WS MIS Database). In future programs, WS may be requested to address damage being caused by striped skunks anywhere in Vermont to protect resources or human health and safety. Skunk damage management activities would target single animals or local populations of the species at sites where their presence was causing unacceptable damage to agriculture, human health or safety, natural resources, or property. Some local populations may be temporarily reduced as a result of MDM projects aimed at reducing damage at a local site. Based upon current and an anticipated increase in requests for striped skunk damage management assistance in the future, it is unlikely that WS would kill more than 500 striped skunks per year in all MDM activities in Vermont.

Based upon the above information, WS limited lethal take of striped skunks would have no adverse impacts on overall striped skunk populations in Vermont. The VTFW has determined that there is no evidence to suggest that human mediated mortality resulting from regulated harvest and damage management, including removal by WS, will be detrimental to the survival of striped skunk populations in the state of Vermont (K. Royar, pers. comm., 2006).

Woodchuck Population Information and Effects Analysis

The woodchuck is a large rodent, often seen in pastures, meadows, and fields in Vermont. They dig large burrows, generally 8-12 inches at the opening, sometimes 5 feet deep and 30 feet long with more than 1 entrance to a spacious grass filled chamber. Green vegetation such as grasses, clover, and alfalfa forms its diet; at times it will feed heavily on corn and can cause extensive damage in a garden to other crops (National Audubon Society 2000).

The breeding season for woodchucks is usually from March through April (Bollengier, 1994). Female woodchucks usually produce from 4 to 6 young (Chapman and Feldhamer, 1982) with the off-spring breeding at age 1 and typically living 4-5 years. Mammal species with high mortality rates, such as rodents (ie. woodchucks) and lagomorphs (ie. rabbits), typically possess high reproductive rates and produce large and frequent litters of young (Smith 1996). For example, if a pair of woodchucks and their offspring all survived to breed as soon as possible, with an average litter size of 4 with a 1:1 sex ratio; they could produce over 645 woodchucks through their lifetime.

Woodchucks are considered game animals in many states. There is usually no bag limit or closed season (Bollengier 1994). In Vermont, the season for groundhogs is year round with no limit on the number that can be taken. Woodchuck population trends in Vermont are unknown. No population data or density information was available for woodchucks in Vermont.

Wildlife Services responded to 825 requests (average = 103/yr) for assistance with woodchuck damage during FY 1998-2005. Resources affected included human health and safety, general property, residential and non-residential buildings, and landscaping. Damage also included burrowing/digging, nuisance, rabies threats, and other threats (USDA - MIS Database 2005). While most complaints were handled by providing technical assistance advice on methods for addressing damage, Wildlife Services killed 35 woodchucks (average = 4.4/yr) in all MDM programs in Vermont during FY 1998-2005 (WS MIS Database 2005).

Woodchuck damage management activities would target single animals or local populations of the species at sites where their presence was causing unacceptable damage to agriculture, human health or safety, natural resources, or property. Some local populations may be temporarily reduced as a result of MDM projects aimed at reducing damage at a local site. Based upon an anticipated increase in woodchuck damage management activities in the future, it is unlikely that WS would kill more than 500 woodchucks per year in all MDM activities in Vermont.

Based upon the above information, WS limited lethal take of woodchucks would have no adverse impacts on overall woodchuck populations in Vermont. The VTFW has determined that there is no evidence to suggest that human mediated mortality resulting from regulated harvest and damage management, including removal by WS, will be detrimental to the survival of the woodchuck population in the state of Vermont (K. Royar, pers. comm. 2006).

Other Target Species

Target species, in addition to beaver, red fox, raccoons, skunks and woodchucks analyzed above, may need to be removed in small numbers by WS in the future, including white-tailed deer, moose, black bear, coyote, gray fox, bobcat, otter, mink, muskrats, and porcupine. These other target species could be killed during MDM. Based upon an anticipated increase in future requests for WS assistance, WS predicts that no more than 50 individuals of each of the above mentioned “other target mammal species” would be lethally removed annually under the proposed action.

None of these mammal species are expected to be taken by WS MDM at any level that would adversely affect overall mammal populations. Damage management activities would target single animals or local populations of these “other target mammal species” at sites where their presence was causing unacceptable damage to agriculture, human health or safety, natural resources, or property. Some local populations may be temporarily reduced as a result of MDM projects aimed at reducing damage at a local site. Most of these mammals are regulated by the VTFW and the take is limited by permit. Therefore, these mammals are taken in accordance with applicable state laws and regulations authorizing including the VTFW permitting process. The VTFW, as the agency with management responsibility, could impose restrictions on depredation harvest as needed to assure cumulative take does not adversely affect the continued viability of populations. This should assure that cumulative impacts on these mammal populations would have no significant adverse impact on the quality of the human environment.

Based upon the above information, WS limited lethal take of the above listed “other target mammal species” would have no adverse impacts on overall populations in Vermont. The VTFW has determined that there is no evidence to suggest that human mediated mortality resulting from regulated harvest and damage management, including removal by WS, will be detrimental to the survival of these “other target mammal species” populations in the state of Vermont (R. Regan, pers. comm.. 2006).

4.1.1.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, WS would not kill any target mammal species because no lethal methods would be used. Although WS lethal take of mammals would not occur, it is likely that without WS conducting some level of lethal MDM activities for these species; private MDM efforts would increase, leading to potentially similar or even greater effects on target species populations than those of the current program alternative. For the same reasons shown in the population effects analysis in section 4.1.1.2, it is unlikely that target mammal populations would be adversely impacted by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of other chemicals which could lead to real but unknown effects on target mammal populations (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). Effects and hypothetical risks of illegal

chemical toxicant use under this alternative would probably be about the same as those under Alternative 1, but less than Alternative 4.

4.1.1.4 Alternative 4: No Federal WS Mammal Damage Management

WS would conduct no mammal damage management activities under this alternative. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Under this alternative, WS would have no impact on target mammal populations in the State. Private efforts to reduce or prevent damage and conflicts could increase which could result in effects on target species populations to an unknown degree. Effects on target species under this alternative could be the same, less, or more than those of the proposed action depending on the level of effort expended by these individuals. Some resource owners experiencing damage may trap or shoot mammals, or hire private trappers. Some mammal populations would continue to increase where trapping and shooting pressure was low and may decline or stabilize where trapping and shooting pressure was adequate.

Since affected resource owners would likely lethally remove the damaging mammal that would no longer be removed by WS, private efforts to reduce or prevent mammal damage and conflicts could increase, which could result in similar or even greater effects on those populations than the Proposed Action. However, for the same reasons shown below in the population effects analysis in section 4.1.1.2, it is unlikely that target mammal populations would be adversely impacted by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of other chemicals which could lead to real but unknown effects on target mammal populations (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003).

4.1.2 Effects on Other Wildlife Species, including T&E Species

4.1.2.1 Alternative 1: Technical Assistance Only

Adverse Effects on Nontarget Species. Alternative 1 would not allow any WS direct operational MDM in Vermont. Non-target or T&E species would not be impacted by WS activities from this alternative. Technical assistance or self-help information would be provided at the request of producers and others. Although technical support might lead to more selective use of control methods by private parties than that which might occur under Alternative 4, private efforts to reduce or prevent damage and conflicts could still result in less experienced persons implementing control methods, leading to greater take of non-target wildlife than under the proposed action. It is hypothetically possible that, similar to Alternative 3 and 4, frustration caused by the inability to reduce damage and associated losses could lead to illegal use of chemical toxicants which could lead to unknown effects on local non-target species populations, including some T&E species (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). Hazards to raptors, including bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

Beneficial Effects on Nontarget Species. The ability to reduce negative impacts caused by mammals to wildlife species and their habitats, including T&E species, would be variable based upon the skills and abilities of the person implementing control actions. It would be expected that this alternative would have a greater chance of reducing damage than Alternative 4 since WS would be available to provide information and advice.

4.1.2.2 Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage a specific mammal species to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS management activities may have less of an impact on non-target species than if the non-federal entity conducted the action alone. Thus, in those situations, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Adverse Effects on Non-target (non-T&E) Species. Direct impacts on non-target species occur when WS program personnel inadvertently kill, injure, or harass animals that are not target species. In general, these impacts result from the use of methods that are not completely selective for target species. Non-target wildlife species are usually not affected by WS's non-lethal management methods, except for the occasional scaring from harassment devices. In these cases, migratory birds and other affected non-target wildlife may temporarily leave the immediate vicinity of scaring, but would most likely return after conclusion of the action.

To date, lethal take of non-target species by WS while conducting MDM activities in Vermont is rare. WS take of non-target species during MDM activities is expected to be extremely low to non-existent. While every precaution is taken to safeguard against taking non-target wildlife, changes in local animal movements and other unanticipated events can result in the incidental take of unintended species. These occurrences are rare and should not affect the overall populations of any species under the current program. The VTFW concurs that Vermont WS mammal damage management activities would have no adverse effects on native wildlife populations in Vermont, including non-target species that may be taken under the proposed program (R. Regan, pers. comm., 2006).

WS personnel are experienced and trained in wildlife identification, and to select the most appropriate methods for taking targeted animals and excluding non-target species. Shooting is virtually 100% selective for the target species; therefore no adverse impacts are anticipated from use of this method. WS personnel use animal lures, and set traps and snares in locations that are conducive to capturing target animals while minimizing potential impacts to non-target species. Any non-target species captured unharmed in a live trap would be subsequently released on site. No adverse impacts from the use of registered pesticides and repellents are anticipated. Based on a thorough Risk Assessment, APHIS concluded that, when WS program chemical methods are used in accordance with label directions, they are highly selective to target individuals or populations, and such use has negligible effects on the environment (USDA 1997). SOPs designed and implemented to avoid adverse effects on non-target species are described in Chapter 3.

Beneficial Effects on Non-target Species. This alternative has the greatest possibility of successfully reducing mammal damage and conflicts to wildlife species since all MDM methods could possibly be implemented or recommended by WS.

T&E Species Effects. Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. The USFWS's and VTFW's list of Federal and State T&E species for Vermont were reviewed by WS to determine whether any T&E species might be affected by the proposed action. SOPs to avoid adverse impacts on T&E are described in Chapter 3.

Federally listed species

WS has consulted with the USFWS under Section 7 of the ESA concerning potential impacts of MDM methods on T&E species and has obtained a Biological Opinion. For the full context of the Biological Opinion, see Appendix F of the ADC Final EIS (USDA 1997, Appendix F). For the preparation of this EA, WS obtained and reviewed the list of federally listed T&E species for the state of Vermont (Appendix C) and determined that the proposed WS MDM program would not likely adversely affect any T&E species or critical habitat. Based upon WS adherence to recommendations provided by the USFWS, the USFWS concurs with WS not likely to adversely affect determination (Appendix D). WS will abide by the recommendations provided by the USFWS as part of this informal consultation process.

Effects on Bald Eagle

As stated in the 1992 BO, the USFWS has determined that the only MDM methods that might adversely affect the bald eagle were the use of leghold (foothold) traps used near animal carcasses or large pieces of meat; and the above ground use of strychnine treated bait. It is WS program policy to set leghold traps no closer than 30 feet from exposed bait to prevent the capture of non-target animals. Strychnine is no longer registered for above ground use and would not be used by WS for MDM in the State. Therefore, WS use of MDM in Vermont is not likely to adversely affect bald eagles.

Effects on Canada Lynx

The USFWS published the final rule to list the Canada lynx on March 24, 2000 (Federal Register, 50 CFR Part 17). The Final Rule identifies the listed population as the "U.S. District Population Segment" which occurs or historically occurred in forested portions of the States of Colorado, Idaho, Maine, Michigan, Minnesota, Montana, New Hampshire, New York, Oregon, Utah, Vermont, Washington, and Wisconsin. WS wildlife biologists consulted on the Canada lynx with USFWS in Regions 3 and 5 in March 2001. The USFWS (letter from L. Lewis, USFWS, Acting Assistant Regional Director to G. Larson, WS Eastern Regional Director, May 9, 2001) determined that, Canada lynx are unlikely to be affected by WS MDM actions. This letter states that a "not likely to adversely affect" determination is appropriate for APHIS-WS operational programs, including those in Vermont.

State listed species

WS has obtained and reviewed the list of Vermont State listed T&E species (Appendix E) and has determined that the proposed WS MDM program is not likely to adversely impact any state listed endangered or threatened species. The VTFW has concurred with WS that the proposed program is not likely to adversely affect any Vermont State listed species (Appendix F).

4.1.2.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS

Adverse Effects on Nont-target Species. Under this alternative, WS lethal take of non-target animals would hypothetically be less than that of the proposed action because no lethal control actions would be taken by WS. Non-target species are usually not affected by WS's non-lethal management methods, except for the occasional scaring from harassment devices. In these cases, affected non-target wildlife may temporarily leave the immediate vicinity of scaring, but would most likely return after conclusion of the action. However, if mammal damage problems were not effectively resolved by non-lethal control methods, members of the public may resort to lethal means of control such as the use of firearms, traps, snares, registered pesticides, or even the illegal use of chemical toxicants (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). These efforts to reduce or prevent depredations could result in less experienced persons implementing control methods, leading to greater take of non-target wildlife than under the proposed action. It is hypothetically possible that, similar to Alternative 1 and 4, frustration caused by the inability to reduce damage and associated losses could lead to illegal use of chemical toxicants which could

lead to unknown effects on local non-target species populations, including some T&E species. Hazards to raptors, including bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

Beneficial Effects on Non-target Species. This alternative would reduce negative impacts caused by mammals to wildlife species and their habitats, including T&E species, if non-lethal methods were effective in reducing such damage to acceptable levels. If non-lethal methods were ineffective at reducing damage to acceptable levels, WS would not be available to conduct or provide advice on any other types of control methods. In these situations it would be expected that mammal damage to wildlife species and their habitats would likely remain the same or possibly increase dependent upon actions taken by the affected resource or landowner.

4.1.2.4 Alternative 4: No Federal WS Mammal Damage Management

There would be no impact on other wildlife species or T&E species by WS from this alternative. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Adverse Effects on Non-target Species. Alternative 4 would not allow any WS MDM in the State. There would be no impact on non-target or T&E species by WS MDM activities from this alternative. Private efforts to reduce or prevent depredations could result in less experienced persons implementing control methods, leading to greater take of non-target wildlife than under the proposed action. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of chemical toxicants which could lead to unknown effects on local non-target species populations, including some T&E species (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). Hazards to raptors, including bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

One anticipated outcome of no WS MDM program is a likely increase in damage and conflicts associated beaver created impoundments if resource owners did not remove beaver dams. These impoundments would likely have an impact on other wildlife and plant species. The extent and nature of the impacts would depend upon the size of the beaver created impoundment and the diversity of plant and animal species in the area. Some species would flourish in the newly created environment, while others would diminish.

Beneficial Effects on Non-target Species. The ability to reduce negative impacts caused by mammals to wildlife species and their habitats, including T&E species, would be variable based upon the skills and abilities of the person implementing control actions.

4.1.3 Effects on Human Health and Safety

When used improperly or by untrained individuals, various methods used in mammal damage management projects could pose risks to humans. Methods analyzed that could pose risks to human health and safety include the use of explosives, chemicals, firearms, snares, foothold traps, conibear traps, and harassment with pyrotechnics. No accidents resulting in harm to any persons have occurred under the current WS MDM program in Vermont. A formal risk assessment of WS operational management methods found that risks to human safety were low (USDA 1997). Wildlife Services SOP's include measures intended to mitigate or reduce the effects on human health and safety and are presented in Chapter 3. Risk to members of the public from WS use of explosives to remove beaver dams; or from use of chemicals, firearms, snares, foothold traps or body-gripping traps to take mammals would remain low due to adherence to WS policies, required safety precautions, and training.

4.1.3.1 Safety and Efficacy of Chemical Control Methods

Alternative 1: Technical Assistance Only

Concerns about human health and safety risks from WS's use of chemical MDM methods would be alleviated because no such use would occur. WS would provide technical advice to those persons requesting assistance. Resource owners could use information provided by WS or implement their own damage reduction program without WS' technical assistance. Negative impacts to human health and safety resulting from the improper use of chemical control methods should be less than Alternative 4 when WS' technical advice is followed.

Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

Wildlife Services personnel uses binary explosives to remove beaver dams in certain situations. Wildlife Services personnel who use explosives are certified through comprehensive training and must be able to demonstrate competence and safety in their use. They adhere to WS policies as well as regulations related to explosives use, storage, and transportation enforced by the Bureau of Alcohol, Tobacco and Firearms, the Occupational Safety and Health Administration, and the Department of Transportation. When explosives are used, signs are placed to warn the public of these activities. Where dams are near roads, police or other road officials are used to stop traffic and public entry to ensure public safety. No adverse effects to public safety are expected from the use of explosives by WS in Vermont.

Chemical MDM methods are regulated by EPA under FIFRA, and VTPID Laws. Their use by WS personnel is carefully defined in WS Directives. Based on a thorough Risk Assessment, APHIS concluded that, when WS Program chemical methods are used in accordance with label directions, they are highly selective to target individuals or populations, and such use has negligible effects on the environment (USDA 1997). Therefore, no adverse effects to public safety are expected from the use of chemical MDM methods by WS. Under the proposed alternative WS may use certain EPA registered pesticides, including Gas Cartridges which are used as a den fumigant. Gas Cartridges are placed in burrows/dens and are burned to create carbon monoxide gas to euthanize animals. Applicators must exercise caution to avoid burns to the skin or surrounding vegetation.

Non-lethal MDM chemicals that might be used or recommended by WS include repellents. Such chemicals must undergo rigorous testing and research to prove safety, effectiveness, and low environmental risks before EPA or FDA would register them. Any operational uses of chemical repellents would be in accordance with labeling requirements under FIFRA and state pesticide laws and regulations that are established to avoid unreasonable adverse effects on the environment. Following labeling requirements and use restrictions are a built-in mitigation measure that would assure that use of registered chemical products would avoid significant adverse effects on human health and safety.

Drugs used in capturing, handling, and euthanizing wildlife for wildlife hazard management purposes include ketamine hydrochloride, xylazine (Rompun), sodium pentobarbital, Beuthanasia-D, and a mixture of tiletamine and zolazepam (Telazol). Meeting the requirements of the AMDUCA should prevent any significant adverse impacts on human health with regard to this issue. Mitigation measures that would be part of the standard operating procedures include:

- All drug use in capturing and handling wildlife would be under the direction and authority of state veterinary authorities, either directly or through procedures agreed upon between those authorities and APHIS-WS. As determined on a state-level basis by these veterinary authorities (as allowed by AMDUCA), wildlife hazard management programs

may choose to avoid capture and handling activities that utilize immobilizing drugs within a specified number of days prior to the hunting or trapping season for the target species to avoid release of animals that may be consumed by hunters prior to the end of established withdrawal periods for the particular drugs used. Ear tagging or other marking of animals drugged and released to alert hunters and trappers that they should contact state officials before consuming the animal.

- Most animals administered drugs would be released well before state controlled hunting/trapping seasons which would give the drug time to completely metabolize out of the animals' systems before they might be taken and consumed by humans. In some instances, animals collected for control purposes would be euthanized when they are captured within a certain specified time period prior to the legal hunting or trapping season to avoid the chance that they would be consumed as food while still potentially having immobilizing drugs in their systems.

By following these procedures in accordance with AMDUCA, wildlife management programs would avoid any significant impacts on human health with regard to this issue.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage a specific mammal species to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Alternative 3: Non-lethal Mammal Damage Management Only by WS

Alternative 3 would not allow for any lethal chemical method to be used by WS in the State. WS could implement non-lethal chemical methods such repellants, chemical immobilization and beaver dam removal. Impacts from WS use of these chemicals would be similar to those described under the proposed action.

Excessive cost or ineffectiveness of non-lethal techniques could result in some entities rejecting WS's assistance and resorting to other means of MDM. Resource owners inexperienced in the safe and proper use of chemical MDM methods may attempt to resolve mammal damage problems. The potential for illegal use of chemical toxicants under this alternative might pose threats to human health and safety if such chemicals were used indiscriminately in areas used by humans, or where such chemicals might be transported into the human food chain.

Alternative 4: No Federal WS Mammal Damage Management

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Concerns about human health and safety risks from WS's use of chemical MDM methods would be alleviated because no such use would occur. Resource owners could use any legal MDM chemical available to them, including EPA registered chemicals and the use of explosives to remove beaver dams. Without professional assistance or proper training in the use of chemical MDM methods, there is the potential for increased risks to public safety. Resource owners inexperienced in the safe and proper use of chemical MDM methods may attempt to resolve mammal damage problems.

The potential for illegal use of chemical toxicants under this alternative might pose threats to human health and safety if such chemicals were used indiscriminately in areas used by humans, or where such chemicals might be transported into the human food chain.

4.1.3.2 Impacts on Human Safety of Non-chemical MDM Methods

Alternative 1: Technical Assistance Only

Concerns about human health and safety risks from WS's use of non-chemical MDM methods would be alleviated because no such use would occur. WS would provide technical advice to those persons requesting assistance. Resource owners could use information provided by WS or implement their own damage reduction program without WS' technical assistance. Negative impacts to human health and safety resulting from the improper use of non-chemical control methods should be less than Alternative 4 when WS' technical advice is followed.

Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

Non-chemical BDM methods that might raise safety concerns include shooting with firearms; use of traps and snares; and harassment with pyrotechnics. No adverse affects on human safety from WS's use of these methods is expected. A formal risk assessment of WS's operational management methods found that risks to human safety were low (USDA 1997, Appendix P). Firearms, traps, snares and pyrotechnics are only used by WS personnel who are experienced in handling and using them. The Vermont WS program has had no accidents involving the use of firearms, traps, or pyrotechnics in which any person was harmed. Wildlife Services personnel are trained and given refresher courses to maintain awareness of firearm and pyrotechnic safety and handling as prescribed by WS policy. Snares and traps are strategically placed to minimize exposure to the public. Signs are used to post properties where traps are set to alert the public of their presence. In addition, large body-gripping traps are restricted to water sets according to WS policy, which further reduces threats to public safety.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage a specific mammal species to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, non-chemical non-lethal MDM methods used by WS that might raise safety concerns include shooting with firearms when used as a harassment technique, live traps, and harassment with pyrotechnics. Impacts from WS use of these non-chemical methods would be similar to those described under the proposed action.

Excessive cost or ineffectiveness of non-lethal techniques could result in some entities rejecting WS's assistance and resorting to other means of MDM. Resource owners could use any legal MDM available to them, including traps, snares, and firearms. Without professional assistance or proper training in the use of these methods, there is the potential for increased risks to public safety. Resource owners inexperienced in the safe and proper use of non-chemical MDM methods may attempt to resolve mammal damage problems. These increased risks are associated with the improper or inexperienced use of damage management methods such as trapping and shooting.

Alternative 4: No Federal WS Mammal Damage Management

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Concerns about human health and safety risks from WS's use of non-chemical MDM methods would be alleviated because no such use would occur. Resource owners could use any legal MDM non-chemical available to them, including traps, snares, and firearms. Without professional assistance or proper training in the use of non-chemical MDM methods, there is the potential for increased risks to public safety. Resource owners inexperienced in the safe and proper use of non-chemical MDM methods may attempt to resolve mammal damage problems. These increased risks are associated with the improper or inexperienced use of damage management methods such as trapping and shooting.

Impacts on Human Health and Safety from Mammals

Alternative 1: Technical Assistance Only

Resource owners could use the information provided by WS or implement their own damage reduction program without WS technical assistance. When WS technical advice is requested and followed, disease and mammal aircraft strike threats to human health and safety should be less than Alternative 4. However, resource owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, adverse impacts to human health and safety could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

People are concerned with potential disease threats; and injury and loss of human life as a result of mammal/aircraft collisions. An IWDM strategy, a combination of lethal and non-lethal means, has the greatest potential of successfully reducing this risk. All MDM methods could possibly be implemented and recommended by WS.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage a specific mammal species to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, WS would be restricted to implementing and recommending only non-lethal methods in providing assistance with mammal damage problems. The success or failure of the use of non-lethal methods can be quite variable. If non-lethal methods were ineffective at reducing damage and threats to human health and safety, WS would not be able to provide any other type of assistance. In these situations, mammal damage would likely continue to increase unless resource owners implemented an effective MDM program in the absence of WS. Resource owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, adverse impacts to human health and safety could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

Alternative 4: No Federal WS Mammal Damage Management

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Mammal damage would likely continue to increase unless resource owners implemented an effective MDM program in the absence of WS. Resource owners could implement their own damage reduction program without WS assistance. Resource owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, adverse impacts to human health and safety could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

4.1.4 Impacts to Stakeholders, including Aesthetics

4.1.4.1 Effects on Human Affectionate Bonds with Individual Mammals and on Aesthetic Values of Wild Mammal Species

Alternative 1: Technical Assistance Only

Under this alternative, WS would not conduct any direct operational MDM, but would still provide technical assistance or self-help advice to persons requesting assistance with mammal damage. Those who oppose direct operational assistance in wildlife damage management by the government, but favor government technical assistance, would favor this alternative. Persons who have developed affectionate bonds with individual wild mammals would not be affected by WS's activities under this alternative because the individual animals would not be killed by WS. However, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS resulting in impacts similar to the Proposed Action alternative.

Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

Those who routinely view or feed individual mammals would likely be disturbed by removal of such animals under the proposed program. WS is aware of such concerns and takes these concerns into consideration to mitigate effects. WS may be able to mitigate such concerns by leaving certain animals that have been identified by interested individuals.

Some members of the public have expressed opposition to the killing of any mammals during MDM activities. Under this Proposed Action alternative, some lethal control of mammals would occur and these persons would be opposed. However, many persons who voice opposition have no direct connection or opportunity to view or enjoy the particular animals that would be killed by WS's lethal control activities. Lethal control actions would generally be restricted to local sites and to small, unsubstantial percentages of overall populations. Therefore, the species subjected to limited lethal control actions would remain common and abundant and would, therefore, continue to remain available for viewing by persons with that interest.

Lethal removal of mammals from airports should not affect the public's enjoyment of the aesthetics of the environment since airport properties are closed to public access. The ability to view and interact with animals at these sites is usually either restricted to viewing from a location outside boundary fences or is forbidden.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage a specific mammal species to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, WS would not conduct any lethal MDM, but may conduct harassment of mammals that are causing damage. Some people who oppose lethal control of wildlife by the government, but are tolerant of government involvement in non-lethal wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild mammals would not be affected by the death of individual animals under this alternative, but might oppose dispersal or translocation of certain animals. WS may be able to mitigate such concerns by leaving certain animals that have been identified by interested individuals. In addition, the abundant populations of target mammal species would enable people to continue to view them and to establish affectionate bonds with individual wild mammals. Although WS would not perform any lethal activities under this alternative, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, resulting in impacts similar to the proposed action alternative.

Alternative 4: No Federal WS Mammal Damage Management

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Under this alternative, WS would not conduct any MDM in Vermont. Those in opposition of any government involvement in wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild mammals would not be affected by WS's activities under this alternative. However, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, resulting in impacts similar to the proposed action alternative.

4.1.4.2 Effects On Aesthetic Values of Property Damaged by Mammals

Alternative 1: Technical Assistance Only

Wildlife Services would provide technical advice to those persons requesting assistance. Resource owners could use the information provided by WS or implement their own damage reduction program without WS technical assistance. When WS technical advice is requested and followed, impacts on those persons adversely affected by mammal damage should be less than Alternative 4. However, resource owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, mammal damage could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

Damage to property would be expected to decrease under this alternative since all available damage management methods and strategies would be available for WS use and consideration.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage a specific mammal species to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, WS would be restricted to implementing and recommending only non-lethal methods in providing assistance with mammal damage problems. The success or failure of

the use of non-lethal methods can be quite variable. If non-lethal methods were ineffective at reducing damage, WS would not be able to provide any other type of assistance. In these situations, mammal damage would likely continue to increase unless resource owners implemented an effective MDM program in the absence of WS. Resource owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, mammal damage could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

Alternative 4: No Federal WS Mammal Damage Management

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Mammal damage would likely continue to increase unless resource owners implemented an effective MDM program in the absence of WS. Resource owners could implement their own damage reduction program without WS assistance. Resource owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, adverse impacts could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

4.1.5 Humaneness and Animal Welfare Concerns of Methods Used

4.1.5.1 Alternative 1: Technical Assistance Only

Under this alternative, WS would provide self-help advice only. Lethal methods viewed as inhumane by some persons would not be used by WS. Resource owners could use the information provided by WS or implement their own damage reduction program without WS technical assistance. Many of the methods considered inhumane by some individuals and groups might still be used by resource owners. Overall impacts should be less than Alternative 4 when WS technical advice is requested and followed.

4.1.5.2 Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

MDM methods viewed by some persons as inhumane would be used by WS under this alternative. Despite SOP's designed to maximize humaneness, the perceived stress and trauma associated with being held in foothold traps or snares until the WS employee arrives at the trap or snare site to dispatch or release the animal, is unacceptable to some persons. In addition, these methods are used in "drown sets" where the animal drowns shortly after being caught which is also considered inhumane by some persons. Other MDM methods used to take target animals including shooting and body-gripping traps (i.e., Conibear) result in a relatively humane death because the animals die instantly or within seconds to a few minutes. These methods however, are also considered inhumane by some individuals.

WS uses chemical immobilization/euthanasia drugs, and EPA registered and approved pesticides, such as den fumigants, to manage damage caused by some mammals in Vermont. Some individuals consider the use of such chemical methods to be inhumane.

WS personnel are experienced and professional in their use of management methods, and methods are applied as humanely as possible. Under this Alternative, mammals would be trapped as humanely as possible or shot by experienced WS personnel using the best and most appropriate method(s) available. Some animal rights activists may perceive this method as inhumane because they oppose all lethal methods of damage management.

Wildlife Services WS has improved the selectivity and humaneness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some MDM methods are used in situations where nonlethal damage management methods are not practical or effective.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage a specific mammal species to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

4.1.5.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, lethal methods, viewed as inhumane by some persons, would not be used by WS. Although WS would not perform any lethal activities under this alternative, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, resulting in impacts similar to the proposed action alternative.

4.1.5.4 Alternative 4: No Federal WS Mammal Damage Management

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Under this alternative, lethal methods, viewed as inhumane by some persons, would not be used by WS. Although WS would not perform any lethal activities under this alternative, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, resulting in impacts similar to the proposed action alternative.

4.1.6 Effects on Wetlands

4.1.6.1 Alternative 1: Technical Assistance Only

Wildlife Services would have no direct impact on wetlands. WS would provide technical advice to those persons requesting assistance. Resource owners could use the information provided by WS or implement their own damage reduction program without WS technical assistance. Overall impacts to wetlands should be less than Alternative 4 when WS technical advice is requested and followed.

4.1.6.2 Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action).

Beaver dams could be breached or removed by hand or with explosives for the purpose of returning streams, channels, dikes, culverts, and irrigation canals to their original drainage pattern under this Alternative. Beaver dams are removed according to Section 404 of the Clean Water Act. WS breaches/removes most beaver dams because of flooding areas such as yards, parks, roads, railroads, timberlands, croplands, pastures, and other types of property or resources that were not previously flooded. Most dams that WS breaches or removes are created as a result of recent beaver activity. Dams are typically less than one year in age due to WS' personnel receiving most requests soon after resource/property owners discover damage and contact WS. Recently flooded sites do not possess wetland characteristics, and wildlife habitat values are not the same as established wetlands. Appendix G describes the procedures used by WS to assure compliance with pertinent laws and regulations. For these reasons WS beaver dam removal/breaching activities should have minimal impact on wetlands.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage a specific mammal species to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

4.1.6.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS

Beaver dams could be breached or removed by hand or with explosives for the purpose of returning streams, channels, dikes, culverts, and irrigation canals to their original drainage pattern under this Alternative. Wildlife Services impacts on wetlands would be similar to the proposed action alternative.

4.1.6.4 Alternative 4: No Federal WS Mammal Damage Management

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Wildlife Services would have no impact on wetlands. Under this alternative, beaver dam breaching/removal needs would be met by private, state, or local government entities. Some beaver impounded areas that WS would advise against draining might be drained under private or local government management, which could have potential adverse effects on wetland habitats in limited circumstances.

4.2 CUMULATIVE IMPACTS

Cumulative impacts, as defined by CEQ (40 CFR 1508.7), are impacts to the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts may result from individually minor, but collectively significant, actions taking place over time.

Under Alternatives 1, 2 and 3, WS would address damage associated with mammals in a number of situations throughout the State. The WS MDM program would be the primary federal program with MDM responsibilities; however, some state and local government agencies may conduct MDM activities in Vermont as well. Through ongoing coordination with these agencies, WS is aware of such MDM activities and may provide technical assistance in such efforts. WS does not normally conduct direct damage management activities concurrently with such agencies in the same area, but may conduct MDM activities at adjacent sites within the same time frame. In addition, commercial pest control companies may conduct MDM activities in the same area. The potential cumulative impacts analyzed below could occur either as a result of WS MDM program activities over time, or as a result of the aggregate effects of those activities combined with the activities of other agencies and individuals.

Cumulative Impacts on Wildlife Populations

Mammal Damage Management methods used or recommended by the WS program in Vermont will likely have no cumulative adverse effects on target and non-target wildlife populations. WS limited lethal take of target mammal species is anticipated to have minimal impacts on target mammal populations in Vermont. When control actions are implemented by WS the potential lethal take of non-target wildlife species is expected to be minimal to non-existent.

Cumulative Impacts on Human Health and Safety

Chemical Methods

Lethal chemical MDM methods may include the use of gas cartridges. Gas cartridges are used to primarily to manage damage being caused by woodchucks.

Sodium nitrate is the principle active chemical in gas cartridges, is a naturally occurring substance. Although stable under dry conditions, it is readily soluble in water and likely to be highly mobile in soils. In addition, dissolved nitrate is very mobile, moving quickly through the vadose zone to the underlying water table (Bouwer 1989). Burning sodium nitrate however, as in the use of a gas cartridge as a fumigant in a rodent burrow, is believed to produce mostly simple organic and inorganic gases, using all of the available sodium nitrate. In addition, the human health drinking water tolerance level for this chemical is 10 mg / L, a relatively large amount, according to EPA Quality Criteria for Water (1986c). The gas along with other components of the cartridge, are likely to form oxides of nitrogen, carbon, phosphorus, and sulfur. These products are environmentally non-persistent because they are likely to be metabolized by soil microorganisms or enter their respective elemental cycles. In rodent cartridges, sodium nitrate is combined with seven additional ingredients; sulfur, charcoal, red phosphorus, mineral oil, sawdust, and two inert ingredients. None of the additional ingredients in this formulation is likely to accumulate in soil, based on their degradation into simpler elements by burning the gas cartridge. Sodium nitrate is not expected to accumulate in soils between applications, nor does it accumulate in the tissues of target animals (USEPA 1991g). No gas residues remain at the treatment site where either formulation is used, for any period of time (USDA 1997), and so, no significant cumulative effects from the presence of gases can be expected. Based on properties and fate of sodium nitrate and its components as used in gas cartridges as a fumigant in WS MDM programs in Vermont, no significant cumulative effects to human health and safety are expected from its use in such programs.

Gas cartridges are available to the public in Vermont and this method might be used by some. Any non-WS programs that might employ gas cartridges for purposes specified on product labels would not collectively produce cumulative effects for the same reasons outlined for WS MDM programs. Therefore, no significant cumulative effects on human health and safety are expected from all combined activities involving gas cartridge use for the management of damage caused by mammals.

Based on use patterns, the chemical and physical characteristics of gas cartridges, and factors related to the environmental fate of this chemical, no cumulative impacts are expected from the lethal chemical components used or recommended by the WS MDM program in Vermont.

Non-lethal chemicals may also be used or recommended by the WS MDM program in Vermont. Characteristics of these chemicals and use patterns indicate that no significant cumulative impacts related to environmental fate are expected from their use in WS MDM programs in Vermont.

Non-Chemical Methods

All non-chemical MDM methods, such as trapping, snaring, shooting, harassment methods, etc. are used and expended within a limited time frame, are not residual, and do not possess properties capable of inducing significant cumulative impacts on human health and safety.

Cumulative Impacts to Stakeholders, including Aesthetics

Impacts on Human Affectionate-bonds

In the wild, few animals in the United States have life spans approaching that of humans. Most wild mammals viewed frequently by people, such as squirrels, raccoons, and white-tailed deer, live less than five years. Mortality is high among wildlife populations and specific individuals among a species may experience death early in life. This is a natural occurrence and humans who form affectionate bonds with animals experience loss of those animals over time, in most instances. A number of professionals in the field of psychology have studied human behavior in response to attachment to pet animals (Gerwolls, 1994,

Marks and Koepke 1994, Zasloff 1996, Archer 1999, Ross and Baron-Sorensen 1998, Meyers, 2000) and observations made regarding this is probably applicable to close bonds which could exist between people and wild animals. As observed by researchers in human behavior, normal human responses to loss of loved ones proceed through phases of shock or emotional numbness, sense of loss, grief, acceptance of the loss or what cannot be changed, healing, and acceptance and rebuilding which leads to resumption of normal lives (Lefrancois 1999). Those who lose companion animals, or animals for which they may have developed a bond and affection, are observed to proceed through the same phases as with the loss of human companions (Gerwolls 1994, Boyce 1998, Meyers 2000). However, they usually establish a bond with other individual animals after such losses. Although they may lose the sense of enjoyment and meaning from the association with those animals which die or are no longer accessible, they usually find a similar meaningfulness by establishing an association with new individual animals or through other relational activities (Weisman 1991). Through this process of coping with the loss and establishing new affectionate bonds, people may avoid compounding emotional effects resulting from such losses (Parkes 1979, Lefrancois 1999).

Some mammals with which humans have established affectionate bonds may be removed from some project sites by WS MDM actions in Vermont. Other individuals of the same species continue to be present in the area and people tend to establish new bonds with those remaining animals. In addition, human behavior processes usually result in individuals ultimately returning to normalcy after experiencing the loss of association with a wild animal which might be removed from a specific location by WS MDM actions. Therefore, no significant cumulative effects on human affectionate bonds are expected from WS MDM programs in Vermont. Other non-WS actions which may disrupt human affectionate bonds with wildlife, such as natural wildlife mortality, hunter take, and other occurrences, in combination with the removal or dispersal of animals by WS, is not expected to collectively cumulatively affect this element of the human environment.

Impacts on Aesthetic Enjoyment of Wildlife

Those who enjoy viewing wildlife may experience a temporary reduction in being able to view wildlife at some sites where WS MDM programs have removed animals. However, other animals may replace those removed, and other animals may be viewed and enjoyed at adjacent locations. Because effects on aesthetic enjoyment gained by viewing wildlife are temporary, no significant cumulative effects are expected as a result of WS MDM actions. Other non-WS actions which may temporarily and locally reduce the presence of wildlife for public viewing, such as natural wildlife mortality, hunter take, and other occurrences, combined with removal of animals by WS, is not expected to collectively alter the availability of wildlife on a local, region or statewide scale. Wildlife will remain available for aesthetic enjoyment, and so no overall significant cumulative effects are expected regarding this element of the human environment.

Some people experience a decrease in aesthetic enjoyment of wildlife that cause damage and threaten human health and safety. The reduction of such threats and damage through WS MDM actions could reduce this type of negative aesthetic damage and also the possibility of cumulative degradation of the public's attitude about a particular mammal species, or wildlife in general. WS activities are not expected to have any significant cumulative effects on this element of the human environment.

Cumulative Impacts on Humaneness and Animal Welfare Concerns of MDM Methods

WS continues to seek new methods and to improve current technology to improve humaneness of methods in managing damage caused by mammals. Cooperation with individuals and organizations involved in animal welfare continues to be an agency priority for the purpose of evaluating WS strategies and defining research aimed at developing methods for MDM programs. Because WS continues to develop and implement more humane methods as technology advances, no significant cumulative effects from WS MDM actions are expected. Combined MDM activities of other entities which have the potential to affect concerns about humaneness of MDM methods, coupled with all WS MDM activities are not expected to have any significant cumulative effects on this element of the human environment.

Cumulative Impacts on Wetlands

WS MDM programs that sometimes occur in wetlands or wetland-like habitat are beaver damage management. In these activities WS programs do not result in net loss of established wetlands, nor do MDM activities result in progressive or cumulative reductions of established wetlands, or in cumulative damage or cumulative alterations of established wetlands. Therefore, WS MDM programs, considered collectively with all other MDM activities by other entities in Vermont, are not expected to have any significant cumulative effects on wetlands in the state.

SUMMARY

No significant cumulative environmental impacts are expected from any of the 4 alternatives. Under the Proposed Action, the lethal removal of mammals by WS would not have a significant impact on overall target mammal populations in Vermont, but some local reductions may occur. No risk to public safety is expected when WS's services are provided and accepted by requesting individuals in Alternatives 1, 2, and 3, since only trained and experienced wildlife biologists/specialists would conduct and recommend MDM activities. There is a slight increased risk to public safety when persons who reject WS assistance and recommendations in Alternatives 1, 2 and 3 and conduct their own MDM activities, and when no WS assistance is provided in Alternative 4. In all 4 Alternatives, however, it would not be to the point that the impacts would be significant.

Under Alternative 4, management actions taken by non-federal entities would be considered the *environmental status quo*. In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage a specific mammal species to stop damage with or without WS assistance in Alternatives 1, 2 and 3, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Although some persons will likely be opposed to WS's participation in MDM activities on public and private lands within the state of Vermont, the analysis in this EA indicates that WS Integrated MDM program will not result in significant cumulative adverse impacts on the quality of the human environment. Table 4-2 summarizes the expected impact of each of the alternatives on each of the issues.

Table 4-2. Summary of Potential Impacts.

Issue	<u>Alternative 1</u> Technical Assistance Only	<u>Alternative 2</u> Integrated Mammal Damage Management Program (Proposed Action/No Action)	<u>Alternative 3</u> Nonlethal MDM Only by WS	<u>Alternative 4</u> No Federal WS MDM Program
1. Effects on Target Mammal Species	No effect by WS. Low effect - reductions in local target mammal numbers by non-WS personnel likely; would not adversely affect state and regional populations.	Low effect - reductions in local target mammal numbers; would not adversely affect state and regional populations.	No effect by WS. Low effect - reductions in local target mammal numbers by non-WS personnel likely; would not adversely affect state and regional populations.	No effect by WS. Low effect - reductions in local target mammal numbers by non-WS personnel likely; would not adversely affect state and regional populations
2. Effects on Other Wildlife Species, Including T&E Species	No effect by WS. Impacts by non-WS personnel would be variable.	Low effect - methods used by WS would be highly selective with very little risk to non-target species.	Low effect - methods used by WS would be highly selective with very little risk to non-target species.	No effect by WS. Impacts by non-WS personnel would be variable.
3. Effects on Human Health and Safety	Efforts by non-WS personnel to reduce or prevent conflicts could result in less experienced persons implementing control methods, leading to a greater potential of not reducing mammal damage than under the proposed action.	The proposed action has the greatest potential of successfully reducing this risk. Low risk from methods used by WS.	Impacts could be greater under this alternative than the proposed action. Low risk from methods used by WS.	Efforts by non-WS personnel to reduce or prevent conflicts could result in less experienced persons implementing control methods, leading to a greater potential of not reducing mammal damage than under the proposed action.
4a. Aesthetic Values of Wild Mammal Species	Low to moderate effect. Local mammal numbers in damage situations would remain high or possibly increase unless non-WS personnel successfully implement MDM methods; no adverse affect on overall regional and state target mammal populations.	Low to moderate effect. Some local populations may be reduced; no adverse affect on overall regional and state target mammal populations.	Low to moderate effect. Local mammal numbers in damage situations would remain high or possibly increase when non-lethal methods are ineffective unless non-WS personnel successfully implement lethal methods; no adverse affect on overall regional and state target mammal populations.	Low to moderate effect. Local mammal numbers in damage situations would remain high or possibly increase unless non-WS personnel successfully implement MDM methods; no adverse affect on overall regional and state target mammal populations.
4b. Aesthetic Values of Property Damaged by Mammals	Moderate to High effect – mammal damage may not be reduced to acceptable levels.	Low effect - mammal damage problems most likely to be resolved.	Moderate to High effect - mammal damage may not be reduced to acceptable levels.	High effect - mammal problems less likely to be resolved without WS involvement.
5. Humaneness and Animal Welfare Concerns of Methods Used	No effect by WS. Impacts by non-WS personnel would be variable.	Low to moderate effect - methods viewed by some people as inhumane would be used by WS.	Lower effect than Alt. 2 since only non-lethal methods would be used by WS.	No effect by WS. Impacts by non-WS personnel would be variable.
6. Effects on Wetlands	No effect by WS. Impacts by non-WS personnel would be variable.	No adverse impact by WS.	No adverse impact by WS.	No effect by WS. Impacts by non-WS personnel would be variable.

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APPENDIX B

MAMMAL DAMAGE MANAGEMENT METHODS AVAILABLE FOR USE OR RECOMMENDATION BY THE VERMONT WILDLIFE SERVICES PROGRAM

Resource owners and government agencies have used a variety of techniques to reduce mammal damage. However, all lethal and non-lethal methods developed to date have limitations based on costs, logistics, or effectiveness. Below is a discussion of mammal damage management methods currently available to the Vermont WS program. If other methods are proven effective and legal to use in Vermont, they could be incorporated into the program, based upon NEPA compliance.

Nonchemical Mammal Damage Management Methods

Nonchemical management methods consist primarily of tools or devices used to repel, capture or kill a particular animal or local population of wildlife to alleviate resource damage. Methods may be non-lethal (e.g., fencing, frightening devices, dam removal etc.) or lethal (e.g., firearms, Conibear traps, snares, etc.). If WS personnel apply these methods on private lands, an *Agreement for Control on Private Property* must be signed by the landowner or administrator authorizing the use of each damage management method. Nonchemical methods used or recommended by WS include:

Exclusion pertains to preventing access to resources through fencing or other barriers. Fencing of small critical areas can sometimes prevent animals which cannot climb from entering areas of protected resources. Fencing of culverts, drain pipes, and other water control structures can sometimes prevent beavers from building dams which plug these devices (Arner 1964, Roblee 1984, Laramie and Knowles 1985, Lisle 1996). In those applications, however, consideration must be given for water flow so that the fence does not act to catch and hold water-borne debris. Fencing, especially if it is installed with an underground skirt, can prevent access to areas for many mammal species which dig, including coyotes, foxes, woodchucks, beaver and muskrat. Areas such as airports, yards or hay meadows may be fenced. Hardware cloth or other metal barriers can sometimes be used to prevent girdling and gnawing of valuable trees and to prevent the entry of mammals into buildings through existing holes or gaps. Riprap and construction of concrete spillways may reduce or prevent damage to dams or levees by burrowing aquatic rodent species. Electrical water barriers have proven effective in limited situations for beaver; an electrical field through the water in a ditch or other narrow channel, or hot-wire suspended just above the water level in areas protected from public access, have been effective at keeping beaver out. The effectiveness of an electrical barrier is extended when used in conjunction with an odor or taste cue that is emitted because beaver will avoid the area even if the electrical field is discontinued (Kolz and Johnson 1997). Similarly, electric fences of various constructions have been used effectively to reduce damage to various crops by deer, raccoons, and other species (Craven and Hygnstrom 1994, Boggess 1994b).

Cultural Methods and Habitat Management includes the application of practices which seek to minimize exposure of the protected resource to damaging animals through processes other than exclusion. They may include animal husbandry practices such as employing guard dogs, herders, shed lambing, carcass removal, or pasture selection. Strategies may also include minimizing cover where damaging mammals might hide, manipulating the surrounding environment through barriers or fences to deter animals from entering a protected area, removing trees along stream banks to discourage the presence of beavers, removing woody vegetation around buildings to reduce access and damage caused by raccoons, or planting lure crops on fringes of protected crops. Continual destruction of beaver dams and removal of dam construction materials on a daily basis will sometimes cause beavers to move to other locations, although this strategy can be far more expensive than removing beavers in conjunction with dam removal. Water control devices such as the 3-log drain (Roblee 1983), the T-culvert guard (Roblee 1987), wire mesh culvert (Roblee 1983), and the Clemson beaver pond leveler (Miller and Yarrow 1994, Minnesota Department of Natural Resources 1994, Nolte et al. 2000) can sometimes be used to control the water in beaver ponds to desirable levels that do not cause damage. Such methods have variable results and rarely provide acceptable levels of control unless used in an integrated program with other strategies. Some mammals which cause damage in urban environments are attracted to homes by the presence of garbage or pet food left outside and unprotected. Removal

or sealing of garbage in tight trash receptacles, and elimination of all pet foods from outside areas can reduce the presence of unwanted mammals.

Beaver Dam Breaching/Removal involves the removal of debris deposited by beaver that impedes the flow of water. Breaching a beaver dam is generally conducted to maintain existing stream channels, restore drainage patterns, and reduce flood waters that have negatively impacted silvicultural, agricultural, or ranching/farming activities. Beaver dams removed by WS are normally from recent beaver activity, and sites have not had enough time to develop characteristics of a true wetland (i.e., hydric soils, hydrophytic vegetation, hydrological function). Unwanted beaver dams may be removed by hand or with explosives (*see* chemical methods below). Because beaver dams involve waters of the United States, removal is regulated under Section 404 of the CWA.

Beaver dam breaching does not affect substrate or natural course of streams. Breaching beaver dams often re-establishes preexisting conditions with similar flows and circulations. Most beaver dam breaching operations, if considered discharge, are covered under 33 CFR 323 or 330 and do not require a permit. A permit would be required if the beaver dam breaching activity is not covered by a 404 permitting exemption or NWP and the area affected by the beaver dam was considered a true wetland. WS' personnel survey the site or impoundment to determine if conditions exist for classifying the site as a true wetland. If the site appears to have conditions over 3 years old or appears to meet the definition of a true wetland, the landowner or cooperator is required to obtain a permit before proceeding (See Appendix G for information that explains Section 404 permit exemptions and conditions for breaching/removing beaver dams).

Lure crops/alternate foods are crops planted or other food resources provided to mitigate the potential loss of higher value crops

Animal behavior modification refers to tactics that deter or repel damaging mammals and thus, reduce damage to the protected resource. These techniques are usually aimed at causing target animals to respond by fleeing from the site or remaining at a distance. They usually employ extreme noise or visual stimuli. Unfortunately, many of these techniques are only effective for a short time before wildlife habituate to them (Conover 1982). Devices used to modify behavior in mammals include:

- electronic guards (siren strobe-light devices)
- propane exploders
- pyrotechnics
- laser lights
- human effigies
- harassment / shooting into groups or herds

Live Capture and Relocation can be accomplished through the use of cage traps, snares, and foothold traps to capture some species of mammals for the purpose of translocating them for release to wild sites. WS sometimes uses these methods to conduct MDM programs in Vermont when the target animal(s) can legally be relocated or can be captured and handled with relative safety by WS personnel. Live capture and handling of wild mammals poses an additional level of human health and safety threat if target animals are aggressive, large, or extremely sensitive to the close proximity of humans. For that reason, WS may limit this method to specific situations and certain species. Excessive populations may make this a poor wildlife management strategy for some species. In addition, moving damage-causing individuals to other locations can typically result in damage at the new location, or the translocated individuals can move from the relocation site to areas where they are unwanted. The American Veterinary Medical Association, the National Association of State Public Health Veterinarians, and the Council of State and Territorial Epidemiologists all oppose the relocation of mammals because of the risk of disease transmission, particularly for small mammals such as raccoons or skunks (Center for Disease Control 1990). Although relocation is not necessarily precluded in all cases, it would in many cases be logistically impractical and biologically unwise in Vermont, and is evaluated by WS on a case-by-case basis.

Trapping can utilize a number of devices, including footholds, cage-type traps, and Conibear (body-gripping) traps, foot snares, and neck/body snares. For a description of these methods the reader is referred to the FEIS, Appendix J

(USDA 1997). These techniques are usually implemented by WS personnel because of the technical training required to use such devices.

Foothold (Leghold) Traps can be effectively used to capture a variety of mammals. Foothold traps are either placed beside, or in some situations, in travel ways being actively used by the target species. Placement of traps is contingent upon the habits of the respective target species, habitat conditions, and presence of non-target animals. Effective trap placement and adjustment and the use and placement of appropriate baits and lures by trained WS personnel also contribute to the foothold trap's selectivity. An additional advantage is that foothold traps can allow for the on-site release of non-target animals. The use of foothold traps requires more skill than some methods, but they are indispensable in resolving many damage problems.

Snares are capture devices comprised of a cable formed in a loop with a locking device and placed in travel ways. Most snares are also equipped with a swivel to minimize cable twisting and breakage. Snares are also easier than foothold traps to keep operational during periods of inclement weather. Snares set to catch an animal around the body or legs are usually a live-capture method.

Cage traps are live capture traps used to trap a variety of small to medium sized mammals. Cage traps come in a variety of sizes and are made of galvanized wire mesh, and consist of a treadle in the middle of the cage that triggers the door to close behind the animal being trapped.

Hancock/Bailey Traps (suitcase/basket type cage traps) are designed to live-capture beaver. The trap is constructed of a metal frame that is hinged with springs attached and covered with chain-link fence. The trap's appearance is similar to a large clam when closed. When set, the trap is opened to allow an animal to enter the *clam shells*, when tripped the *clam shells* close around the animal. One advantage of using the Hancock or Bailey trap is the ease of release of beaver or non-target animals. Beaver caught in Hancock or Bailey traps could also be humanely euthanized. Disadvantages are that these traps are very expensive (>\$300 per trap), cumbersome, and difficult to set (Miller and Yarrow 1994). The trap weighs about 25 pounds and is relatively bulky to carry and maneuver. Hancock and Bailey traps can also be dangerous to set (i.e., hardhats are recommended when setting suitcase traps), are less cost and time-efficient than snares, footholds, or body-grip traps, and may cause serious and debilitating injury to river otters (Blundell et al. 1999).

Body-grip (e.g., Conibear-type) Traps are designed to cause the quick death of the animal that activates the trap. The size 330 Conibear trap is generally used for beaver exclusively in aquatic habitats, with placement depths varying from a few inches to several feet below the water surface. Placement is in travel ways or at lodge or burrow entrances created or used by the target species. The animal captured as it travels through the trap and activates the triggering mechanism. Safety hazards and risks to humans are usually related to setting, placing, checking, or removing the traps. Body-grip traps present a minor risk to non-target animals because of the placement in aquatic habitats and below the water surface.

Shooting is selective for target species and may involve the use of spotlights and either a handgun, shotgun or rifle. Shooting is an effective method to remove a small number of mammals in damage situations, especially where trapping is not feasible. Removal of specific animals in the problem area can sometimes provide immediate relief from a problem. Shooting is sometimes utilized as one of the first lethal damage management options because it offers the potential of resolving a problem more quickly and selectively than some other methods, but it is not always effective. Shooting may sometimes be one of the only damage management options available if other factors preclude setting of damage management equipment. WS personnel receive firearms safety training to use firearms that are necessary for performing their duties.

Denning is the practice of finding fox and coyote dens and eliminating the young, adults, or both to stop an ongoing predation problem or prevent future depredation on livestock. Till and Knowlton (1983) documented denning's cost-effectiveness and high degree of efficacy in resolving predation problems due to coyotes killing lambs. Coyote and red fox depredations on livestock often increase in the spring and early summer due to the increased food

requirements associated with feeding and rearing litters of pups. Removal of pups will often stop depredations even if the adults are not taken (Till 1992). Pups are typically euthanized in the den using a registered gas fumigant cartridge (see discussion of gas cartridge under *Chemical Mammal Management Methods*).

Hunting/Trapping: WS sometimes recommends that resource owners consider legal hunting and trapping as an option for reducing mammal damage. Although legal hunting/trapping is impractical and/or prohibited in many urban-suburban areas, it can be used to reduce some populations of mammals.

Chemical Mammal Damage Management Methods

Explosives are defined as any chemical mixture or device which serves as a blasting agent or detonator. Explosives are generally used to breach beaver dams that are too large to remove by hand digging and typically after beaver have been removed from a damage situation. Binary explosives consist of ammonium nitrate and nitromethane and are not classified as explosives until mixed. Therefore, binary explosives are subject to fewer regulations and controls. However, once mixed, binary explosives are considered high explosives and subject to all applicable federal requirements. Detonating cord and detonators are considered explosives and WS must adhere to all applicable State and federal regulations for storage, transportation, and handling. All WS' explosive specialists are required to attend 30 hours of extensive explosive safety training and spend time with a certified explosive specialist in the field prior to obtaining certification. All blasting activities are conducted by well-trained, certified blasters and closely supervised by professional wildlife biologists. Explosive handling and use procedures follow the rules and guidelines set forth by the Institute of Makers of Explosives which is the safety arm of the commercial explosive industry in the United States and Canada. WS also adheres to transportation and storage regulations from State and federal agencies such as Occupational Safety and Health Association, Bureau of Alcohol, Tobacco, and Firearms, and the Department of Transportation.

Pesticides used by WS are registered under the FIFRA and administered by the EPA and VTPID. All WS personnel in Vermont who apply restricted - use pesticides are certified pesticide applicators by VTPID and have specific training by WS for wildlife damage management pesticide application. The EPA and VTPID require pesticide applicators to adhere to all certification requirements set forth in the FIFRA. No chemicals are used by WS on public or private lands without authorization from the land management agency or property owner or manager. The following chemical methods have been proven to be selective and effective in reducing damage by mammals.

Sodium nitrate is the principle active chemical in gas cartridges, is a naturally occurring substance. Although stable under dry conditions, it is readily soluble in water and likely to be highly mobile in soils. In addition, dissolved nitrate is very mobile, moving quickly through the vadose zone to the underlying water table (Bouwer 1989). Burning sodium nitrate however, as in the use of a gas cartridge as a fumigant in a rodent burrow or coyote den, is believed to produce mostly simple organic and inorganic gases, using all of the available sodium nitrate. In addition, the human health drinking water tolerance level for this chemical is 10 mg / L, a relatively large amount, according to EPA Quality Criteria for Water (1986c). The gas along with other components of the cartridge, are likely to form oxides of nitrogen, carbon, phosphorus, and sulfur. These products are environmentally non-persistent because they are likely to be metabolized by soil microorganisms or enter their respective elemental cycles. In rodent cartridges, sodium nitrate is combined with seven additional ingredients; sulfur, charcoal, red phosphorus, mineral oil, sawdust, and two inert ingredients. Coyote gas cartridges contain sodium nitrate and charcoal. None of the additional ingredients in these two formulations are likely to accumulate in soil, based on their degradation into simpler elements by burning the gas cartridge. Sodium nitrate is not expected to accumulate in soils between applications, nor does it accumulate in the tissues of target animals (USEPA 1991g). No gas residues remain at the treatment site where either formulation is used, for any period of time (USDA 1997).

The **Gas Cartridge** is registered as a fumigant by the EPA (Reg. No. 56228-21). When ignited, the cartridge burns in the den of an animal and produces large amounts of carbon monoxide, a colorless, odorless, and tasteless, poisonous gas. The combination of oxygen depletion and carbon monoxide exposure kills the animals

in the den. Carbon monoxide euthanasia is recognized by the AVMA as an approved and humane method to kill animals (AVMA 1987).

Ketamine (Ketamine HCl) is a dissociative anesthetic that is used to capture wildlife, primarily mammals, birds, and reptiles. It is used to eliminate pain, calm fear, and allay anxiety. Ketamine is possibly the most versatile drug for chemical capture, and it has a wide safety margin (Fowler and Miller 1999). When used alone, this drug may produce muscle tension, resulting in shaking, staring, increased body heat, and, on occasion, seizures. Usually, ketamine is combined with other drugs such as xylazine. The combination of such drugs is used to control an animal, maximize the reduction of stress and pain, and increase human and animal safety.

Telazol (tiletamine) is another anesthetic used in wildlife capture. It is 2.5 to 5 times more potent than ketamine; therefore, it generally works faster and lasts longer. Currently, tiletamine can only be purchased as Telazol, which is a mixture of two drugs: tiletamine and zolazepam (a tranquilizer). Muscle tension varies with species. Telazol produces extensive muscle tension in dogs, but produces a more relaxed anesthesia in coyotes, wolves, and bears. It is often the drug of choice for these wild species (Fowler and Miller 1999). This drug is sold in a powder form and must be reconstituted with sterile water before use. Once mixed with sterile water, the shelf life is four days at room temperature and 14 days if refrigerated.

Xylazine is a sedative (analgesic) that calms nervousness, irritability, and excitement, usually by depressing the central nervous system. Xylazine is commonly used with ketamine to produce a relaxed anesthesia. It can also be used alone to facilitate physical restraint. Because xylazine is not an anesthetic, sedated animals are usually responsive to stimuli. Therefore, personnel should be even more attentive to minimizing sight, sound, and touch. When using ketamine/xylazine combinations, xylazine will usually overcome the tension produced by ketamine, resulting in a relaxed, anesthetized animal (Fowler and Miller 1999). This reduces heat production from muscle tension, but can lead to lower body temperatures when working in cold conditions.

Sodium Pentobarbital is a barbiturate that rapidly depresses the central nervous system to the point of respiratory arrest. There are DEA restrictions on who can possess and administer this drug. Some states may have additional requirements for personnel training and particular sodium pentobarbital products available for use in wildlife. Certified WS personnel are authorized to use sodium pentobarbital and dilutions for euthanasia in accordance with DEA and state regulations.

CO₂ is sometimes used to euthanize mammals which are captured in live traps and when relocation is not a feasible option. Live mammals are placed in a chamber and sealed shut. CO₂ gas is released into the chamber and the animal quickly dies after inhaling the gas. This method is approved as a euthanizing agent by the American Veterinary Medical Association (Beaver et al. 2001). CO₂ gas is a byproduct of animal respiration, is common in the atmosphere, and is required by plants for photosynthesis. It is used to carbonate beverages for human consumption and is also the gas released by dry ice. The use of CO₂ by WS for euthanasia purposes is exceedingly minor and inconsequential to the amounts used for other purposes by society.

Repellents are usually naturally occurring substances or chemicals formulated to be distasteful or to elicit pain or discomfort for target animals when they are smelled, tasted, or contacted. Only a few repellents are commercially available for mammals, and are registered for only a few species. Repellents are not available for many species which may present damage problems, such as some predators or furbearing species. Repellents are variably effective and depend to a great extent on resource to be protected, time and length of application, and sensitivity of the species causing damage. Again, acceptable levels of damage control are usually not realized unless repellents are used in conjunction with other techniques.

Appendix C
Federally Listed Threatened and Endangered Species in Vermont

Animals

- E Bat, Indiana (*Myotis sodalis*)
- E Beetle, American burying (*Nicrophorus americanus*)
- E Curlew, Eskimo (*Numenius borealis*)
- T Eagle, bald (lower 48 States) (*Haliaeetus leucocephalus*)
- E Puma (=cougar), eastern (Puma (=Felis) *concolor cougar*) (considered extirpated)
- E Lynx, Canada (*Lynx Canadensis*)
- T Tiger beetle, Puritan (*Cicindela puritana*)
- E Wedge mussel, dwarf (*Alasmodonta heterodon*)
- T Wolf, gray Eastern Distinct Population Segment (*Canis lupus*)

Plants

- E Milk-vetch, Jesup's (*Astragalus robbinsii* var. *jesupi*)
- E Bulrush, Northeastern (*Scirpus ancistrochaetus*)
- T Pogonia, small whorled (*Isotria medeoloides*)

Appendix D
Correspondence from USFWS Regarding Federal T&E Species



United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087



May 8, 2006

John McConnell
U.S. Department of Agriculture
Animal and Plant Health Inspection Service
59 Chenell Drive, Suite 7
Concord, NH 03301

Dear Mr. McConnell:

This responds to your recent correspondence requesting our review and comments regarding the Pre-Decisional Environmental Assessment (EA) "Reducing Mammal Damage through an Integrated Wildlife Damage Management Program in the State of Vermont" that covers woodchuck, raccoon and muskrat control. Additional mammalian species are mentioned, however, future removal is not anticipated and would occur only after further consultation.

Based on information currently available to us, we concur that the implementation of mammal damage management activities as described in the Pre-Decisional EA will not adversely affect federally-listed threatened or endangered species with the following exceptions. The use of animal behavior modification methods (pyrotechnics, propane exploders, etc.) could pose a risk to nesting bald eagles (*Haliaeetus leucocephalus*) at a location on the Bellows Falls USGS quad. Additionally, habitat modification structures designed to control water levels and, thereby, alleviate beaver damage and conflicts may affect the northeastern bulrush (*Scirpus ancistrochaetus*). For this reason, we ask that this office be contacted before habitat modification structures are proposed in areas of Windham and Windsor Counties associated with the following USGS quads: Bellows Falls, Townshend, Saxtons River, Newfane, Springfield, Chester, and Walpole.

Except as noted above, this concludes our review of the EA for potential impacts to listed species and critical habitat in Vermont. No further Endangered Species Act coordination of this type is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

- 2 -

Thank you for your coordination. Please contact Anthony Tur at 603-223-2541 if we can be of further assistance.

Sincerely yours,

A handwritten signature in black ink that reads "Michael J. Amaral". The signature is written in a cursive, flowing style.

Michael J. Amaral
Endangered Species Specialist
New England Field Office

Appendix E
State Listed Threatened and Endangered Species in Vermont

Birds

Henslow's sparrow	<i>Ammodramus henslowii</i>	Endangered
Grasshopper sparrow	<i>Ammodramus savannarum</i>	Threatened
Upland sandpiper	<i>Bartramia longicauda</i>	Threatened
Black tern	<i>Chlidonias niger</i>	Threatened
Sedge wren	<i>Cistothorus platensis</i>	Endangered
Spruce grouse	<i>Falcapennis Canadensis</i>	Endangered
Bald eagle	<i>Haliaeetus leucocephalus</i>	Endangered
Loggerhead shrike	<i>Lanius ludovicianus</i>	Endangered
Common tern	<i>Sterna hirundo</i>	Endangered

Mammals

Eastern mountain lion	<i>felis concolor cougar</i>	Endangered
Lynx	<i>Lynx Canadensis</i>	Endangered
Marten	<i>Martes Americana</i>	Endangered
Small-footed bat	<i>Myotis leibii</i>	Threatened
Indiana bat	<i>Myotis sodalist</i>	Endangered

Amphibians

Western chorus frog	<i>Pseudacris triseriata</i>	Endangered
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Reptiles

Spiny soft-shell turtle	<i>Apalone spinifera</i>	Threatened
Spotted turtle	<i>Clemmys guttata</i>	Endangered
Timber rattlesnake	<i>Crotalus horridus</i>	Endangered
Five-lined skink	<i>Eumeces fasciatus</i>	Endangered

Fish

Lake sturgeon	<i>Acipenser fulvescens</i>	Endangered
Eastern sand darter	<i>Ammocrypta pellucid</i>	Threatened
Northern brook lamprey	<i>Ichtyomyzon fossor</i>	Endangered
American brook lamprey	<i>Lampetra appendix</i>	Threatened
Stonecat	<i>Noturus flavus</i>	Endangered
Channel darter	<i>Percina copelandi</i>	Endangered

Amphipods

Taconic cave amphipod	<i>Stygobromus borealis</i>	Endangered
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Insects

Beach-dune tiger beetle	<i>Cicindela hirticollis</i>	Threatened
Cobblestone tiger beetle	<i>Cicindela marginipennis</i>	Threatened
Puritan tiger beetle	<i>Cicindela puritana</i>	Threatened

Molluscs

Dwarf wedge mussel	<i>Alasmidonta heterodon</i>	Endangered
Brook floater	<i>Alasmidonta varicosa</i>	Threatened
Cylindrical papershell	<i>Anodontoides ferussacianus</i>	Endangered
Pocketbook	<i>Lampsilis ovata</i>	Endangered
Fluted shell	<i>Lasmigona costata</i>	Endangered
Fragile papershell	<i>Leptodea fragilis</i>	Endangered
Black sandshell	<i>Ligumia recta</i>	Endangered
Eastern pearl mussel	<i>Margaritifera margaritifera</i>	Threatened
Pink heelsplitter	<i>Potamilus alatus</i>	Endangered
Giant floater	<i>Pyganodon grandis</i>	Threatened

Appendix F
Correspondence from VTFW Regarding State-Listed T&E Species

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Department of Fish & Wildlife
103 South Main St., #10 South
Waterbury, Vermont 05671-0501
www.VtFishandWildlife.com

[phone] 802-241-3700
[fax] 802-241-3295
[tdd] 802-828-3345

Agency Of Natural Resources

June 5, 2006



Mr. Gary Nohrenberg, District Supervisor
USDA, APHIS, Wildlife Services
617 Comstock Road, Suite 9
Berlin, VT 05602

Dear Mr. Nohrenberg:

I am writing with regards to your request for review of the pre-decisional "Environmental Assessment (EA) for Reducing Mammal Damage through an Integrated Wildlife Damage Management Program in the State of Vermont." I concur that the mammal damage management activities outlined in this document are not likely to be detrimental to the viability or security of populations at which control actions are directed. I also concur damage management actions are not likely to adversely affect any Vermont-listed threatened or endangered species. I have a few specific comments to make.

First, I noted that no mention was made of bats, perhaps because you do not take bats, per se, only offering exclusion advice at best. But, it is important to note that we have a federal/state listed bat species (the Indiana Bat) and with new information about distribution and abundance in Vermont, coupled with emerging information from New York and New Jersey about these bats roosting in houses, we certainly need to ensure we provide good information about bat control to homeowners and commercial "pest" operators

Second, it would be desirable to mention Vermont's "Best Management Practices for Managing Human-Beaver Conflicts" in the EA. This is important because removing beaver dams may not always be the preferred alternative for addressing a damage issue in terms of maintaining the functional viability of wetlands.

Finally, please note that Appendix E needs to be updated – the common loon, osprey, and peregrine falcon are no longer state-listed species.

Sincerely,

Ronald J. Regan
Director of Wildlife



Protecting and conserving our fish, wildlife, plants, and their habitats for the people of Vermont.

Cc: Doug Blodgett
John Buck
Scott Darling
Tom Decker
Steve Parren
Kim Royar

Appendix G .

Criteria for Beaver Dam Breaching/Removal

Beaver dam breaching/removal is generally conducted to maintain existing stream channels and drainage patterns and/or to reduce flood waters. Beaver dams are often made from natural debris such as logs, sticks, and mud. Dams also might contain man-made materials such as tires, plastic pipe, or plywood. Beaver are opportunistic when it comes to materials used for dam building. Approximately the center of the dam or area closest to the existing channel is dislodged during a beaver dam breaching operation. Impoundments that WS removes are normally from recent beaver activity and have not been in place long enough to take on the factors of a true wetland (i.e., hydric soils, hydrophytic vegetation, hydrology). Beaver dam breaching/removal by hand or with binary explosives does not affect the substrate or the natural course of the stream and returns the area back to its preexisting condition with similar flows and circulations. Because beaver dams involve waters of the United States, dam breaching/removal is regulated under Section 404 of the Clean Water Act (CWA).

Wetlands are recognized by three characteristics: hydric soils, hydrophytic vegetation, and general hydrology. Hydric soils are either composed of, or have a thick surface layer of, decomposed plant materials (muck); sandy soils have dark stains or streaks from organic material in the upper layer where plant material has attached to soil particles. Hydric soils may be bluish gray or gray below the surface or brownish black to black and have the common smell of rotten eggs. Wetlands also have hydrophytic vegetation present such as cattails, bulrushes, willows (*Salix* spp.), sedges (*Carex* spp.), and water plantains (*Alismataceae*). A final indicator is general hydrology which includes standing and flowing water or waterlogged soils during the growing season; high water marks often are present on trees and drift lines of small piles of debris are usually present. Beaver dams usually will develop a layer of organic material at the surface. Silt deposits can occur rapidly, but aquatic vegetation and high water marks (a new high water mark is created by the beaver dam) are usually not present. However, cattails and willows can show up rapidly if they are in the vicinity, but most hydrophytic vegetation takes time to establish.

In most beaver dam breaching/removal operations, the material that is displaced is exempt from permitting or included in a Nationwide Permit (NWP) in accordance with Section 404 of the CWA (33 CFR Part 323). A permit would be required if the impoundment caused by a beaver dam was not covered under a NWP or permitting exemption and was a true wetland. WS' biologists and specialists survey the beaver dam site and impoundment to determine if conditions exist for classifying the site as a true wetland. If wetland conditions exist, the landowner or cooperator is asked the approximate age of the dam or how long he/she has known of its presence. This information is useful in determining if Swampbuster, Section 404 permit exemptions, or nationwide permits will allow breaching/removal of the beaver dam. If it is determined that a dam cannot be removed or breached under provisions provided by Swampbusters, 404 permit exemption or NWP, the landowner or cooperator is responsible for obtaining a Section 404 permit before the dam could be breached/removed by WS.

The following explains Section 404 exemptions and conditions that pertain to the breaching/removal of beaver dams.

33 CFR 323 - Permits For Discharges of Dredged or Fill Material into Waters of the United States. This regulation provides guidance to determine whether certain activities require permits under Section 404.

Part 323.4 Discharges not requiring permits. This section establishes exemptions for discharging certain types of fill into waters of the United States without a permit. Certain minor drainage activities connected with normal farming, ranching, and silvicultural practices do not require a permit as long as these drainages do not include the immediate or gradual conversion of a wetland (i.e., beaver ponds greater than 3 years old) to a non-wetland. Specifically, part (a)(1)(iii)(C)(i) states, “...*fill material incidental to connecting upland drainage facilities (e.g., drainage ditches) to waters of the United States, adequate to effect the removal of excess soil moisture from upland croplands...*”. This indicates that beaver dams that block ditches, canals, or other structures designed to drain water from upland crop fields can be breached without a permit.

Moreover, (a)(1)(iii)(C)(iv) states the following types of activities do not require a permit. *“The discharges of dredged or fill materials incidental to the emergency removal of sandbars, gravel bars, or other similar blockages which are formed during flood flows or other events, where such blockages close or constrict previously existing drainageways and, if not promptly removed, would result in damage to or loss of existing crops or would impair or prevent the plowing, seeding, harvesting or cultivating of crops on land in established use for crop production. Such removal does not include enlarging or extending the dimensions of, or changing the bottom elevations of, the affected drainageway as it existed prior to the formation of the blockage. Removal must be accomplished within one year of discovery of such blockages in order to be eligible for exemption.”* This allows the breaching of beaver dams in natural streams to restore drainage of agricultural lands within one year of discovery.

Part 323.4 (a)(2) allows *“Maintenance, including emergency reconstruction of recently damaged parts, of currently serviceable structures such as dikes, dams, levees, groins, riprap, breakwaters, causeways, bridge abutments or approaches, and transportation structures. Maintenance does not include any modification that changes the character, scope, or size of the original fill design. Emergency reconstruction must occur within a reasonable period of time after damage occurs in order to qualify for this exemption.”* This allows beaver dams to be breached without a permit where they have resulted in damage to roads, culverts, bridges, or levees if it is done in a reasonable amount of time.

33 CFR 330 - NWP Program. The U.S. Army Corp of Engineers (USACE), Chief of Engineers is authorized to grant certain dredge and fill activities on a nationwide basis if they have minimal impact on the environment. NWPs are listed in Appendix A of 33 CFR 330 and permittees must satisfy all terms and conditions established to qualify for their use. Individual beaver dam breaching by WS may be covered by any of the following NWPs if not already exempted from permit requirements by the regulations discussed above. WS complies with all conditions and restrictions placed on NWPs for any instance of beaver dam breaching/removal done under a specific NWP.

Nationwide permits can be used **except** in any component of the National Wild and Scenic River System such as waterways listed as an *“Outstanding Water Resource”*, or any water body which is part of an area designated for *“Recreational or Ecological Significance”*.

NWP 3 authorizes the rehabilitation of those structures, such as culverts, homes, and bridges, destroyed by floods and “discrete events,” such as beaver dams, provided that the activity is commenced within 2 years of the date when the beaver dam was established.

NWP 18 allows minor discharges of dredged and fill material, including the breaching of beaver dams, into all waters of the United States provided that the quantity of discharge and the volume of excavated area does not exceed 10 cubic yards below the plane of the ordinary high water mark (this is normally well below the level of the beaver dam) or is in a “special aquatic site” (wetlands, mudflats, vegetated shallows, riffle and pool complexes, sanctuaries, and refuges). The District Engineer must be “notified” (general conditions for notification apply), if the discharge is between 10-25 cubic yards for a single project or the project is in a special aquatic site and less than $\frac{1}{10}$ of an acre is expected to be lost. If the values are greater than those given, a permit is required. Beaver dams rarely would exceed 2 or 3 cubic yards of backfill into the waters and probably no more than 5 cubic yards would ever be exceeded. Therefore, this stipulation is not restrictive. Beaver dams periodically may be breached in a special aquatic area, but normally the aquatic site will be returned to normal. However, if a true wetland exists, and beaver dam breaching/removal is not allowed under another permit, then a permit must be obtained from the District Engineer.

NWP 27 provides for the discharge of dredge and fill for activities associated with the restoration of wetland and riparian areas with certain restrictions. On non-federal public and private lands, the owner must have: a binding agreement with USFWS or NRCS to conduct restoration; a voluntary wetland restoration project documented by NRCS; or notify the District Engineer according to “notification” procedures. On federal lands, including USACE and USFWS, wetland restoration can take place without any contract or notification. This NWP *“...applies to restoration projects that serve the purpose of*

restoring “natural” wetland hydrology, vegetation, and function to altered and degraded non-tidal wetlands and “natural” functions of riparian areas. This NWP does not authorize the conversion of natural wetlands to another aquatic use...” If operating under this permit, the breaching/removal of a beaver dam would be allowed as long as it was not a true wetland. Non-federal public and private lands require the appropriate agreement, project documentation, or notification to be in place.

A quick response without delays resulting from permitting requirements can be critical to the success of minimizing or preventing beaver damage. Exemptions contained in the above regulations or NWPs provide for the breaching/removal of the majority of beaver dams that Vermont WS encounters. The primary determination that must be made by WS’ personnel is whether a beaver impounded area meets the criteria to be classified as a true wetland or is the area a more recently flooded site lacking true wetland characteristics. Flexibility allowed by these exemptions and NWPs is important for the efficient and effective resolution of many beaver damage problems. Damage often escalates the longer an area remains flooded. In addition, VTFW has also established Best Management Practices for handling human-beaver conflicts that are intended to protect water quality and wetlands while providing guidance on alleviating damage to property associated with beaver activity. WS personnel will conform to those BMP when responding to requests for assistance related to beaver damage in VT.